

### VIC20 GAMES QU

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eate user-definable characters In your own programs.

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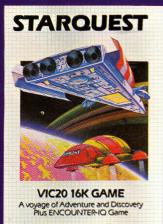


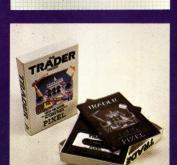
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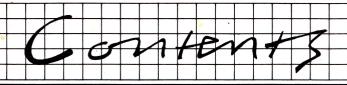
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#### Eye on Commodore: 'irain toil?

Whether or not YOU believe that there's a link between the record business and computer games, other people have decided that high-tech hipness prevails sufficiently in both spheres. The Eye looks on the debut of Virgin Games.

#### Review: The best book you can buy for your Vic?

Book publishers seem to have cottoned on somewhat belatedly to the fact that there's a lot of Vics and 64s out there - which means there's a lot of potential purchasers for Vic/64 books. Here's the one we regard as the cream of the current crop: highly recommended.

#### The Graphics Primer: Part Four -Screen Suspense

Jealous of the Atari's 'player missile graphics'? Kevin Smart continues his easy-to-read survey of the Vic's graphic capabilities with an insight into what he calls "the most undocumented feature of the Vic-20" - it's ability to swap swiftly between two displays without destroying the contents of either.

#### Todd's Lore: Looking after the pennies

Mike Todd keeps up the standard of usefulness in his regular column with a few words about handling pounds and pence in programs.

# **Butterfield:** Part Three — Visiting Vic

Jim Butterfield continues his tour of the Vic's video chip. This time he looks at ways of minimising the amount of space you need to run customised graphics with some of the Vic's standard characters.

#### In Business: The 64 Business Package Catalogue

We circulated everyone we've heard of and obtained information and prices for this descriptive round-up of packages for the Commodore 64 that might be useful for business applications. Includes word processors, spelling checkers, databases and spreadsheet calculators as well as accounting software, stock controllers and payroll packages.

#### **User-defined characters:** The DIY Editor for expanded Vics

Remember Andy Finkel's DIY character editor for defining your own graphics shapes? Well, it doesn't work on expanded Vics — but here's a version that does. Bill Buck has also extended and refined the original version to make it more useful and easier to use.

#### Victuals

Over seven pages of classic programs from readers this time — for unexpanded and expanded Vic, and for Super Expander too. Among them is what looks like a good version of Othello, and a pretty neat Sprite Editor for the 64.

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# ANIROG

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KB/JS

VIC 20

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Brilliant multi-colour graphics, expanded screen, lift, rolling barrels, ladders, running score/HI-score and not to forget the hand bag bonus in this all M/C presentation.

K.B./J.S.

**VIC 20** 

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#### XENO II

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#### 3D TIME TREK

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K.B.

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Popular arcade game. All machine code with brilliant colour graphics and sound effect. Features include snakes, crocodiles, lady frogs. turtles, cars, lorries and logs

KB/JS KB/JS

Unexp. £5.95 VIC 20

KB/JS

SPECTRUM 16K/48K £4.95 **COMMODORE 64** £5.95

#### DOTMAN

Ghosts chase you as you try to eat the dots and collect points. You can turn the tables on them by eating the pills. Don't forget the ghosts have been given intelligence and will try to corner you. This feature makes Dotman exciting and challenging. All M/C game complete with running and highest scores and tunnels

JS/KB

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All M/C version of SCRAMBLE

KB/JS

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# **ABDUCTORS**

A stunning action packed game which uses all of your, TV screen for the superb large animated graphics. Giant Space Hawks whirl and weave in intricate patterns as they drop their deadly homing mines which will destroy your base on contact. While you are busy defending yourself. the Hawks will feed on your helpless population • returning only their skulls. All M/C game complete with high score table that will blow your mind with its graphics and sound effects.

VIC 20

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#### SLAP DAB

An exciting game based on the arcade game PAINTER which combines fast action with strategy. Giant insects hiding under the old paint surface are released by your paint brush. You require fast action and quick thinking to outwit them and finish the panel. The game is 100 percent machine code and HI-RES, graphics also includes HI-score and running score with brilliant sound effects.

KB/JS

VIC 20

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Super games pack for younger children with bright colour graphics and sound effects. Everybody's favourite Simon plus Super Snap. O's and X's, Word Jumble, Bomber, Duck Shoot and Mad Drivers

KB VIC 20

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# Opinion

# Virgin Toil

#### by Henry Deckhand

Not so much an Eye on Commodore this time, more a use of the Eye to look around the Commodore World — alighting especially on the recent arrival of Virgin Games, a new spin-off from Richard Branson's record retailing empire.

"Computer games are coming of age" says Nick Alexander. "Computer games are fulfilling the promise of the '60s that dissipated in the depressingly aimless '70s" says Nick Alexander. "Computer games will make Virgin a lot of money" says Richard Branson.

Well, it seems reasonable enough: a company that makes a fortune flogging cut-price records and ancillary music-world goodies to the excitable youth consumer ought to be able to sell home-computer software. After all, Virgin has undoubted marketing skills in the middling-to-high-tech area for that kind of punter, particularly when it capitalises on hipness as a way of life (and a way of commerce). And what's more hip than home computers?

And so to the Garden Club (formerly Regine's take-out-a-mortgage-for-admission niterie) atop the British Home Stores (formerly Derry & Toms) in fashionable Kensington.

#### Come into the Garden

The Garden does actually have a real garden up there on the roof, real grass and real plants - and a fake river, complete with ducks. flamingoes, birds of paradise, and (at certain spots) an impressively all-pervasive odour of guano. "By invitation only" declared the postcard proclaiming the official launch of Virgin Games, but several hundred assorted freeloaders and a handful of journalists received invites: in both groups the pop business outnumbered the computer hacks and hangers-on. The indifferent wine flowed freely, the snooty waitresses dressed up in silly gear Characters from the games, I think) and handed out minituarised eats (LSI reaches the common household sandwich?), the 12in Bowie was turned down eventually, and Virgin Games' boss N. Alexander presented himself before the mike to illustrate just how feedback works.

He looks a bit of a refugee from the 60s himself, all untamed hair (now starting to recede) and wild-eyed enthusiasm (newly rekindled, one suspects). One of the lost, perhaps: one of the flower children who watched bewildered as the New Age of experimentation and ambition and optimism deteriorated into prepackaged panaceas and the ultimate urban depression of the 1970s. Now he sees a way for us to get back, though, thanks to the mind-stretching potential and popular appeal of the low-cost high-capability home computer.

And so say all of us. But less important than his philosophising (rationalisation?) is the arrival of a wealthy, experienced, ambitious, eager, consumer-oriented, entrereneurial force in the games business. Richard Branson is used to spending money on what he sees as Good Ideas, and he doesn't seem to mind losing it — witness the ill-fated what's-on London magazine Event.

The willingness to throw money at a venture is one characteristic of Virgin's operation. Good-quality youth-oriented packaging and PR is another: Virgin is probably right to promote the computer games operation more to the music press than to the tired old computer hacks you see around far too much.

#### Competitive edge

Some extra ideas can also be expected. Like each cassette has the program on one side (only one copy, though) and "appropriate" music on the other — specially mixed synthesiser muzak from Steve Hillage with a Pretty Average rating.



In terms of resources and marketing expertise the only comparable organisation in the games business is Thorn EMI, and you don't hear much from them any more. (Actually, as it happens Nick Alexander used to work for Thorn — he set up Thorn's Home Computer Division.)

All the other vendors are specialised and smallish outfits who typically started as one-man two-idea operations and achieved success (if any) on the strength of their products and/or their personalities...rather than because they had the financial and other resources to make their stake in the games software business. And if you think that's damning them with faint praise, you should see the list of high-visibility suppliers - all names that will be familiar to Vic owners — who aren't paying their bills for ads in Vic Computing, either because they can't afford to or because their offices are so unprofessionally chaotic.

On the other hand, you might well get rich from computer games by chucking cash at the enterprise. But it's likely that this won't be enough by itself: you'll need some decent products too. So what is Virgin offering?

Not a lot. The intention is to have 30 or so by the end of the year, but of 500 submissions from outside authors Virgin Games picked eight to launch now — four for the Spectrum, three for the BBC, just one for the Vic.

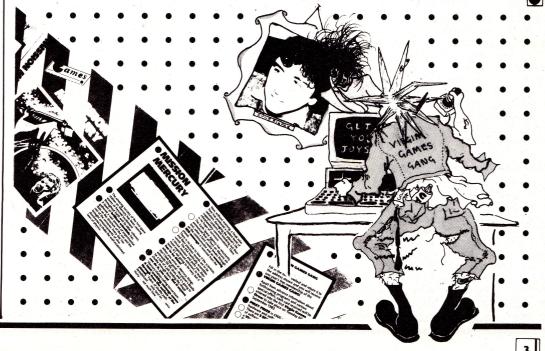
And is Steve Lee's Mission Mercury a good Vic game? We'll

let you know, but a quick trial on the joystick at the Garden suggests it's fair to ok rather than great to fantastic. It's a machine-code moon rescue' tape for the unexpanded Vic at £7.95; reasonable graphics, some nice effects (like the fire button slows or speeds progress of the shuttle, which starts oscillating wildly when it accidentally hits an asteroid). But there's not a lot of on-screen text and once you've done a run or two there isn't much variety in the game — well, what do you expect in 3.5K?

Verdict? Slightly better than par for the course. And that also applies to the other games we tried. Steve Lee obviously has some good ideas, though, and he's working on the 64 now: with more memory and better graphics (better sound, too) we can expect an improvement from him — and from Virgin. He says he's working on an airplane simulator game, with added bird-strikes and thunderstorms.

Incidentally, one of Virgin's keener ideas is to promote the authors of its games as cult figures. Another is to attract punters to join the 'Virgin Games Gang' — fill in the form in the cassette and Virgin gets instant market research plus a mailing list of sales, the purchaser/member gets info on future products and an entry in a regular pot-luck draw. The first of those is due on 6 September and the winner gets £500 worth of computing goodies, with less valuable stuff going to a total of 155 runners-up.

Yes, Virgin could be big in this business: but judgement on whether they would deserve such a position will have to be suspended until some more products (and some better flip sides?) arrive.



# Ander Review

MORE TOP CATS: Impressive claims of high scores on Vic games have been arriving at the office. Martin Seaborn of Dunstable has hit 231,750 on Omega Race — and from a three-ship start, too. Jonathon Goodfield in Taunton did better — 236,350 (and verified by two signatures that look suspiciously as though they belong to close family). And Carl Sedgwick "and a friend" reached 345,680 on Jelly Monsters in Castleford.

Other high scores notified include 81,960 on Radar Ratrace for Justin Mason or Skerries, Co. Dublin — and a whopping 413,790 for Elaine Neilson of New Plymouth, NZ, on Jelly Monsters. Elaine also adds an answer to one of the great conundrums of our time — "the yellow thing (in Jelly Monsters) is an eagle and the blue is the key. After the key is more keys and the monsters never turn blue". Ah, we knew there'd be an obvious solution.

APPLAUSE: Incidentally, Martin Seaborn asked us to give a pat on the back to his local dealer, P&L Computers in Dunstable — "very helpful to everybody whether they have bought their computer from him or not ... offers a superb local service ..." Any other readers with accolades to be awarded?

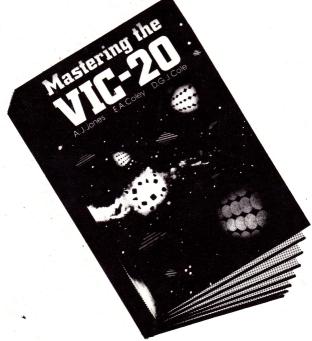
**POSSIBILITIES:** Getting OUT OF MEMORY errors? Try **POKE 56,30.** It sometimes works...

WARM RESTART: Reader Neil Philips remarks that SYS 64824 will reset the Vic without you having to turn it off and on again, SYS 64802 does the same and will also start the cassette if the PLAY button happens to be down. SYS 10 gives the same effect as RUN/STOP and RESTORE.

INSIGHTS: We don't normally flag 'yet to be published' books, but Raeto West's magnum opus Programming the Pet/CBM is so good that we're expecting great things from Programming the Vic-20. It's coming early in September from Edward Arnold as a large-format spiral-bound paperback of 300 or so pages. Price about £13, which seems a bit high...

MORE PRICE CUTS! The current £139 promotion offer on the Vic won't be the last price cut from Commodore. In the States some retail chains are selling the Vic at \$90 or less, and we've seen one New York store putting a \$79.95 sticker on it. Commodore 64s are going for about \$300 from the discount suppliers. We hear the UK price will be below £250 before the end of the year. But it's still a big contrast...

**Best Vic Book Buy?** 



Now this has to be the best book we've come across yet for the Vic. It's called Mastering the Vic-20, it's published by Ellis Horwood and distributed by John Wiley, it's cheaper than Vic Revealed or the Programmer's Reference Guide, and every half-way serious (or even part-way enthusiastic) Vic owner ought to have one.

Why? Two reasons: one is the authors' approach, the other is the content. The former is particularly impressive because most programming books (and especially those for the Vic) are written from a position of knowledge. This one nails its colours to the mast in the preface: "In this book we have tried to lead the reader along the path which we ourselves followed after acquiring a Vic". In other words, it's more a route map of gradually acquired knowledge than a textbook tutorial or a reference book of compressed information. And because of that it should more closely match the needs and the experience of most Vic owners.

It kicks off by assuming you're on top the basics — that you've read the Vic's 'friendly guide' and have written some Basic programs. Thereafter Mastering the Vic-20 gives you a relatively unstructured pot-pourri of advice, tips, tricks, explanations, queries, and genuinely good information. Chapter One, for instance, is called 'Vic Basic' and it offers some expansion on relatively advanced programming — a good starter on variables and strings right on the first page, with only one mistake

(LEFT\$("ABC",2) should produce "AB" not "BC") and at least one clever trick (using LEN with INPUT to prevent a REDO FROM START when a numeric input is expected and something else is typed).

This chapter goes on to arrays and FOR loops, and there's more illustration of the authors' intelligently thoughtful approach to their readers — "Rule of thumb: Long is wrong...The great trade-off in nearly all complex programs is time versus space ... Nowhere is that more apparent in the use of arrays . . . " And they're right, too, which helps. You also get a note on structuring programs, a low-level introduction to PEEK and POKE, an illustrative program in the form of a three-octave music synthesiser, and a couple of pages on logical operators.

Get the idea? There's not a great deal of rigid form to the book, not at least in the sense of logical progression from one concept to the next; that's not to say it is illogical, just that it is constructed as a kind of lucky dip of ideas and techniques.

The second chapter outlines some more advanced programming, mostly based on arrays and Vic arithmetic. Chapter three gets stuck into the internals, where it's particularly good on explaining Vic memory — with the clearest memory table we've yet seen for explaining how memory looks in the various RAM configurations of the Vic.

Hi-res graphics gets a compact and intelligible explanation in a chapter to itself; and there's one chapter devoted to 'Peripheral devices' that contains exactly the kind of information the Vic's user handbook should include — nothing too advanced, just basic information and some good tips. It is especially clear on using the printer, particularly for fancy text presentation, and there's a print-screen-copy routine that looks as good as any we've tried.

The follow-on chapter ('Accessories') looks briefly at the I/O ports and the standard Commodore cartridges in much the same vein — our only quibble was that the difference between 'switch' joysticks and the analogue potentiometer type doesn't get much space. But at least it's mentioned, which is more than most Vic books can say.

And the last chapters offer you the Vic's internal architecture and an intro to machine-code programming. They are brief and commendably clear as an introduction to the subject rather than a tutorial on it — too brief, perhaps.

Lots of useful appendices. A detailed explanation of one tightly-packed Super Expander program (Star Trek); a couple of hi-res examples in Basic and machine code; memory maps; the predictable enough but still useful tables of character sets, screen control codes, and Basic keywords.

The information looks good, but what we really liked was the authors' style. There's a nice sense of humanity throughout, which makes a change from those cold, aloof authors you sometimes suspect of preferring the company of computers to people. 'If the printer is turned on, any attempt to access the disk drive will now cause the system to hang: we frankly admit this puzzles us..." Us, too. "If you are not bothered about understanding hires graphics, then use the Super Expander. If on the other hand you have the time and the inclination to work through Chapters 4, 7 and 8 you will end up doing it all much better..." True, true. printer will occasionally hang during a LIST. We have found no way to overcome this problem short of turning off the entire system..." And nor have we.

Mastering the Vic-20 by A J Jones, E A Coley and D G L Cole: published 1983 by Ellis Horwood, price £5.95. ISBN 0-85312-585-6.



This without doubt is the most undocumentated feature of the Vic-20. I think it's largely to do with the fact that up until now noone has realised the potential in Vic's ability to move the position of the screen memory.

In this article I will explain the principles and applications of this ability - one result of which is the capability to flash between two screens, so quickly that they blend together (similar to but not as powerful as Atari's 'player missile' graphics.)

Down to business. The location of the screen memory, as with the character memory, is under complete control of the user via the Video Interface Chip. This allows us to set up a number of screens (up to eight in the standard Vic) for use in our programs.

What is the point in moving the screen memory? For one thing it allows you to set up a number of screens with different text. This enables you to leave one screen and access another without the original screen being changed.

For example, you could be in the process of drawing a picture in high-resolution and want to see the instructions or menu again. Keeping the instructions on one screen permanently allows us to access the instructions screen without destroying our picture.

How to change the screen location? I don't want to explain how Vic works out the address of the screen because it is very technical (and rather boring.) And I'd also like to warn people with the first edition of Vic Revealed: unfortunately Nick Hampshire's section on moving the screen memory is completely wrong.

Fret not: I've done all the hard

work for you and compiled a table to be used as a reference. In Figure 1 the first column gives the address of all possible locations for the screen on the standard Vic. When you use this table, look down column 1 until you reach the address you would like to use, then read along the row and use the information given to assign variables in the program with the number given.

DEMO 1 can be used to set the screen to the address required. Using Figure 1, replace the variables in line 10 to your requirement. (Note that the screen memory and colour memory change - see Figure 2 for details of the new memory locations used.)

**DEMO 2** is an application of moving the screen memory. One consideration is that there are only two possible locations of the 37888 and screen memory 38400. To avoid interference over colours, therefore, it is best to have one screen which uses 37888 and one which uses 38400 as the start of their colour memory locations in your programs.

Another factor which needs to be taken into account is what happens when you want to use custom characters as well. The problem here is that the address used for changing the character memory is one of the two used for changing the screen memory (36869). So we need a small algorithm to find the correct number to POKE with.

Let's say that on the normal screen we would POKE 36869 with 255 to start the character set at address 7168. Here is the algorithm:

POKE 36869, 255-240 + (new number from Figure 1 in column headed 36869)

DEMO 1



# The Graphic

Location	Description
51 and 52	Point to top of string storage area: PRINT PEEK (51) + 256* PEEK (52)
55 and 56	Point to top of memory accessible by Basic: PRINT PEEK (55) + 256 * PEEK (56)
648	Tells Vic which part of memory it can use as a screen. Must always be POKEd to point to the screen you are using PRINT PEEK (648) * 256
36866	Forms part of the address which tells Vic where the screen memory is
36869	Other part of the address which tells Vic where the screen memory is (see text if you are using defined characters)
Screen	Formula to find screen location. Can be used to convert programs from standard Vic to Vic expanded with more than 8K.  SCREEN = 4*(PEEK(36866) AND 128) + 64* (PEEK (36869) AND 112)
Colour	Formula to find colour screen location: COLOUR = 37888 + 4* (PEEK (36866) AND 128)

Figure 2: Locations in DEMO 1

5 REM *** DEMO 1 *** 10 HIGHRAM=28 : ACCESS=28: LOCAT=240	:	ADDRESS=22	
20 POKE 52, HIGHRAM : POKE 56, HIGHRAM			

30 POKE 64%, ACCESS 40 POKE 36869, LOCAT 50 POKE 36866, ADDRESS

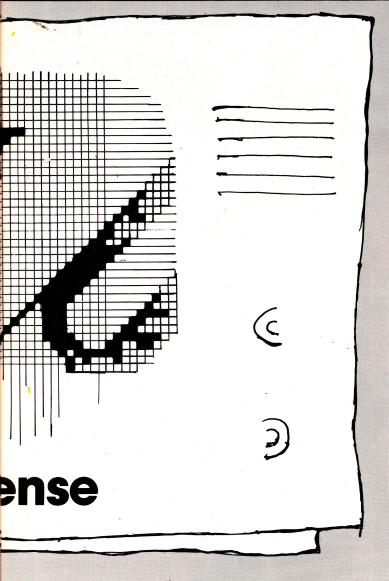
100 SCREEN=4\*(PEEK(36866)AND128)+64\*(PEEK(36869)AND112)

110 COLOUR=37888+4\*(PEEK(36866)AND128)

200 PRINT CHR\$(147)"THE SCREEN MEMORY IS NOW AT LOCATION"SCREEN 210 PRINT:PRINT"THE COLOUR MEMORY IS AT LOCATION"COLOUR

Screen Location	52 and 56 Highram =	648 Access =	36869 Locat =	36866 Address =	Colour Location
7680	30	30	240	150	38400
7168	28	28	240	22	37888
6656	26	26	224	150	38400
6144	24	24	224	22	37888
5632	22	22	208	150	38400
5120	20	20	208	22	37888
4608	18	18	192	150	38400
4096	16	16	192	22	37888

**Figure 1: Changing screen locations** 



# **Primer Part Four** by Kevin Smart

DEMO 2

#### 5 REM \*\*\* DEMO 2 \*\*\* 10 HIGHRAM=28 : ACCESS=28: LOCAT=240 : ADDRESS=22 20 POKE 52, HIGHRAM:POKE56, HIGHRAM 20 POKE 52, HIGHRAM: POKE56, HIGHRAM 30 POKE 648, ACCESS 40 POKE 36869, LOCAT 50 POKE 36866, ADDRESS 100 PRINT CHR\$(147) 110 PRINT"JI CAN BE USEFUL JF YOU HAVE TO LEAVE A" 120 PRINT"SCREEN TO SEE A MENU WITHOUT DISTURBING THE " 130 PRINT"PROGRAM OR GRAPHIC" 140 PRINT"DISPLAY": PRINT"PRESS / F3/ FOR MENU" 150 F0R JACES - 2014 JACES 62 POKE 71 F0R JACES 160 POKE 71 F0R JACE 150 FOR PLACE=22#18T0506: POKE7168+PLACE\_160: POKE37888+PLACE, RND(1)\*8: 160 POKE 648, ACCESS+2 : POKE 36866 ADRESS+128 170 PRINT CHR\$(147) 180 PRINT "WE CAN RETURN WITHOUT DISTURBING THE DISPLAY" 200 POKE 648. ACCESS: POKE 36866, ADDRESS 210 GET KEY\$: IFKEY\$<>CHR\$(134) THEN 210 220 POKE 648. ACCESS+2: POKE36866, ADDRESS+128 230 FOR DELAY=1 TO 2000:NEXT:GOTO200

#### DEMO 3

- 5 POKE 36879,8 : REM BLACK BORDER AND BLACK SCREEN 10 POKE 51,87: POKE 52,27:POKE 55,87:POKE 56,27:CLR 15 POKE 648,28 25 FOR R=0T051: READB: POKE 7100+A,B: NEXT -

#### Now read on . . .

Now we come to the exclusive bit. After eventually working out how to change the position of the screen memory, I read about the advanced Player Missile Graphics on the Atari where several screenfulls of graphics could be flashed together so quickly to look as if they were one single screen. Consumed with jealousy I wondered if my Vic could do it: but I scrapped the idea when I discovered machine code was necessary. I had no experience of machine-code programming.

After reading the Vic Programmer's Reference Guide, though, I plucked up enough courage to try it out. The first problem I encountered was that

SE<sub>1</sub>

LDA # 201

STA 788

LDA #27

STA 789

7100

7101 7103

7106

7108

the routine needed to be called every fraction of a second to stand a chance. I discovered that locations 788 and 789 (Interrupt Request) jumped to a routine every 1/60th of a second to update the 'TI' clock and scan the keyboard. I changed these locations to point to my own routine before going to the proper routine. It worked!

**DEMO 3** is the program for this and Figure 3 gives the mnemonics. BASICally all it does is POKE 36866, 150... POKE 36866, 22... POKE 36866, 150 and so on. DEMO 3 moves a white square over its listing (LIST before RUNning) without interfering with it (because they are on different screens).

Note also that the square seems to move very smoothly because of the flashing. This capability allows us to produce high quality animation programs: for example a star background could be on one screen and a spaceship on another. If appropriate colours are used, the space ship could be made to move in front or behind the stars.

The results will depend on the quality of your TV. On some TVs it will be perfect (no flashing), others will be unintelligible.

I must admit this is a down-market version of Atari's feature, mainly because Atari computers were designed to do it and Vic was not.

This routine only uses two screens but it is quite easy to expand it to use more.

You may in fact be wondering what line 40 does. All it does is stop the program and then CONTinues it again. Why? For some reason unknown to me, POKEing on to the screen without ENDing the program first results in the screens not flashing together at all. The routine needs improving. Any offers? Send them in.

7112 ; D	UMMY VALUE IOT EXECUTED
7113	LDA # 22
7115	STA 36866
7118	SE1
7119	LDA # 221
7121	STA 788
7124	LDA # 27
7126	STA 789
7129	JMP 60095

A 100 9 8 8	NOT EXECUTED	
7133	LDA # 150	
7135	STA 36866	
7138	SE1	
7139	LDA # 201	
7141	STA 788	
7144	LDA # 27	
7146	STA 789	
7149	JMP 60095	

Figure 3: Machine code mnemonics for Atari emulation



With the June issue of **Vic Computing** you should have received a copy of **Commodore User**, the new magazine for everyone who has an interest in getting the most from Commodore computers.

Some readers are worried about our intentions on **Vic Computing**, and we'd like to set the record straight by telling you what we're doing — and why.

First, Vic Computing and Commodore User both come from the Paradox Group. We're small, independent, and specialised: unlike most of the microcomputer mags you see around we aren't part of some money-making publishing megalith. Nor do we intend to become that kind of company.

And we don't make huge profits out of **Vic Computing**. In financial terms, publishing is a bit of a vicious circle — to become successful you have to run pretty big issues with a lot of readers buying the mag and a lot of advertisers advertising in it. But to achieve that level of frequency, circulation and advertising support in the first place takes a lot of money. Up to now we just haven't been able to risk that much investment. Or to put it another way, we simply haven't had the money to invest.

Vic Computing is becoming more successful, though, and that's one reason why we intend to go monthly. It also means we're better able to raise some cash from outside the organisation. And all in all we can now think about going on to the newsstands.

But it's horribly expensive, and that makes it a big risk. Our largest single bill right now is the cost of printing the magazine. And to put the magazine into the country's newsagents we'll have to print many more copies than we do now, so the printer's bill is going to be astronomic.

Still, we do intend to try it. We will of course continue to sell subscriptions for postal delivery to you as well. But from the Autumn we want to be a monthly magazine

Going monthly and being sold by newsagents represents two major changes already for a bimonthly subscription-only magazine. The third change is equally logical — we'll be extending the range of our coverage to include other Commodore 'personal' computers.

And what's the reason for that? It is partly because there's already so much interest from Vic owners in the Commodore 64, particularly in view of what's likely to happen to the 64's price over the next 12 months. Then there's the promise of new under-£500 computers from Commodore: our readers will want to know about them. And finally (of course) there's the financial aspect again — a wider scope means more readers and more advertisers, which in turn means we'll be able to produce thicker issues of the magazine.

Because we will be covering more than just the Vic, there doesn't seem to be much point in clinging to the name Vic Computing. That's why the magazine we go monthly with in

the Autumn will be called **Commodore User** (subject to the approval of Commodore, which owns the name), and it will incorporate **Vic Computing**.

But we'd like to assure you of this: over the year **Commodore User** will give you at least as many pages of editorial content devoted to the Vic-20 as you would have got from **Vic Computing.** That's a total of around 180 pages on the Vic.

And while we will be running some articles specific to other computers — notably the 64, of course — many of the 'extra' editorial pieces will be of relevance to Vic owners, since Commodore computers all tend to follow much the same principles of operation.

What's more, we don't intend to kill off the name 'Vic Computing'. It will be retained for the Vic-only section in the new mag.

Subscribers needn't worry, either. We guarantee that your Vic Computing subscriptions will be honoured for however many issues you're still owed when we make the change.

Nor do we intend to alter the style and balance of the magazine: we like the way Vic Computing reads at the moment, and we hope you do too. But in the expanded mag we should be able to run more readers' programs in the Victuals section and more useful programming tools in A Matter of Routines. And we're retaining all the regular columnists — Butterfield, Todd, Tommy, Henry Deckhand — as well as our regular contributors to Vic Computing.

We aren't entirely altruistic — we would like to make some money — but we don't want to screw anyone. If we were in business simply to make money, we probably wouldn't be doing **Vic Computing** or **Commodore User**: there are easier and more profitable ways to make money out of computers.

But we like publishing, and we like small computers. We buy and use add-on hardware and new programs; we write and use programs; we have to struggle with the same suppliers, products and user manuals that you do; we have all the pleasures and problems of the microcomputer user in the real world. Since the real world demands that we have to have some way of making a living, we regard ourselves as quite lucky as being able to do that by producing a home computing magazine.

We want **Commodoré User** to reflect all of that. We are sure we can produce a good magazine for you — and we're certain it will be a worthy successor to **Vic Computing.** .

It's not just our magazine, though — Vic Computing is yours too. We believe the changes will make for a bigger and better magazine that's good for both of us. But we would like to know what you think now that you've seen the pilot issue of Commodore User and read this. Already we've had some letters on the subject — see the 'Dear Vic' pages — but we would like some more feedback. Write and let us know what you think.

Vic Computing, Commodore User and the future



# Routines

# Your Own INPUT Routine?

#### by Roger Peacock

Those of you who have proudly presented your marvellous new program to family or friends, only to find the dreaded REDO FROM START message cutting a swathe through your laboriously prepared screen display, will know the shortcomings of using the INPUT command in its 'raw' state. As virtually every micro program involves input from the keyboard, it is curious that the language has not evolved more sophisticated features to cope with this. But in the meantime the only realistic choice is to write your own.

For a relatively crash-proof (and user-proof) program it is essential to format and control data that is entered, sifting out and discarding

all those unwanted key presses. The best way of doing this is to create one or more standard subroutines which can thereafter be used for all your programs, helping on the way to standardise and structure your software.

The first step in creating a custom input routine? Throw away the INPUT command and start with the more malleable and controllable GET.

The GET command provides a keyboard scan, returning as a string variable the key depressed at the time (or a null string if no key has been touched). As only one key entry is accepted, you are faced immediately with repeating the

GET to build up the input data until it is terminated by a carriage return.

While performing the iterative process each character can be individually assessed for validity and unwanted key depressions can be discarded. For instance:

1000 REM simple numeric input routine
1010 I\$ = "": I = 0:REM input variables
1020 GET A\$:IF A\$ = ""
THEN 1020: REM await key
1030 IF ASC(A\$) = 13 THEN 1060: REM carriage

return

1040 IF ASC(A\$) < 48 or ASC(A\$) > 57 THEN 1020: REM non-numeric 1050 I\$ = I\$ + A\$: PRINTA\$;: GOTO 1020 1060 I = VAL(I\$): RETURN

Note the use of VAL in line 1060 to produce the numeric variable I from the string. This is probably the best way of producing numerical inputs even if you are simply using the INPUT command alone.

Screen position control can be added by poking locations 781 and 782 with cursor coordinates; but for further control over data type and length there is no substitute for extending the subroutine with a number of conditional data tests.

The main example listed illustrates the kind of standard routine you can build up to give these more complete control fetures, although this is by no means the most advanced control possible.

Before calling the routine, the prompt string (input title) must be specified — along with the row and column at which the prompt will be printed, the maximum and minimum number of characters allowed, and the data type (1 = numeric, 2 = letters). The input is then returned from the routine in **I\$** (string) and **I** (numeric).

The stages of input processing start with lines 250 to 330. There the cursor is positioned (GOSUB 340), the prompt string is printed in reverse mode with a number of dots to indicate maximum input length, and the cursor is repositioned over the first dot ready for business.

Line 400 awaits a key depression, after which lines 410 to 430 sift out carriage return, delete and nonspecified data.

Once it is accepted, line 460 concatenates the entry with I\$, stores the new input length in "L", and prints the entry.

Lines 480 to 490 delete the last character entered (unless L=0), while lines 500 to 530 check for required length, tidy up the screen and return with I and I\$.

The type screening in lines 430 to 440 can be adjusted to accommodate selected punctuation or graphic characters if required: or you could even add other 'types' such as date or time formats with any amount of in-built validity checking.

The rest is up to you, but remember the old 'rubbish in rubbish out' watchword: and do your best to keep the rubbish out of your Vic-20!

```
100 REM *** DEMO OF INPUT SUBROUTINE ***
110 REM *** BY ROGER PEACOCK ***
120 REM *** P$=PROMPT STRING
130 REM *** ROW=ROW
140 REM *** COL=COLUMN
150 REM *** I$=STRING INPUT
160 REM *** I=NUMERICAL INPUT
170 REM *** TYPE=DATA TYPE
                             (1=NUMBERS 2=LETTERS)
180 REM *** MX=MAXIMUM LENGTH
    REM
        *** MN=MINIMUM LENGTH
190
        *** LI=CURRENT ENTRY LENGTH
200 REM
210 REM
220 REM
230 REM
                                                                     DEMONSTRATION
240 PRINT"[CLR]
 OF LISE
250 P$="SURNAME":ROW=3:COL=0:TYPE=2:MX=12:MN=2:GOSUB340:SN$=I$
260 P$="FIRST NAME":ROW=5:COL=0:TYPE=2:MX=10:MN=3:GOSUB340:CN$=I$
270 P$="AGE":ROW=7:COL=3:TYPE=1:MX=3:MN=1:GOSUB340:AGE=I
280 P$="YEAR OF BIRTH":ROW=9:COL=2:TYPE=1:MX=4:MN=4:GOSUB340:YEAR=I
290 P$="SEX":ROW=11:COL=3:TYPE=2:MX=1:MN=1:GOSUB340:SEX$=I$:IFI$="M"ORI$="F"THEN
310
300 GOT0290
310 P$="CITY":ROW=13:COL=2:TYPE=2:MX=13:MN=3:GOSUB340:CITY$=I$
320 P$="HIT RETURN":ROW=22:COL=4:TYPE=2:MX=0:MN=0:GOSUB340
340 REM******INPUT SUBROUTINE************************
350 L=0:I$="":I=0
                                                           REVERSE PROMPT
360 P$=CHR$(18)+P$+CHR$(58)+CHR$(146):REM
                                                          POSITION CURSOR
370 GOSUB540:REM
                                                          PRINT INPUT PROMPT
380 PRINTP$;"*";:FORI=1TOMX-1:PRINT".";:NEXTI:REM
                                                          REPOSITION PROMPT
390 COL=COL+LEN(P$)-1:GOSUB540:REM
                                                          AWAIT ENTRY
400 GETA$: IFA$=""THEN400:REM
                                                          CHECK FOR RETURN
410 I=ASC(A$): IFI=130RI=141THEN500: REM
                                                          CHECK FOR DELETE
    IFI=200RI=148THEN480:REM
420
                                                          INVALID NUMBER
    IFTYPE=1ANDI <480RTYPE=1ANDI>57THEN400:REM
                                                          INVADID LETTER
    IFTYPE=2ANDI<650RTYPE=2ANDI>90THEN400:REM
440
                                                          MAXIMUM LENGTH!
450 IFL=MXTHEN400:REM
                                                               ACCEPT INPUT
460 L=L+1: I$=I$+A$: PRINT"[CUL]"; A$; "*"; : REM
470 GOTO400
                                                          NO DELETE IF NULL
480 IFL=0THEN400:REM
                                                                      DELETE
490 L=L-1: I$=LEFT$(I$,L):PRINT"[CUL][CUL]*.[CUL]"):GOTO400:REM
                                                          TOO SHORT
500 IFLKMNTHEN400:REM
510 PRINT"[CUL] [CUL]";: IFL=MXTHEN530
                                                           REMOVE PROMPT DOTS
520 FORI=LTOMX:PRINT" "; :NEXT:REM
530 I=VAL(I$):RETURN
540 POKE781,ROW:POKE782,COL:POKE783,0:SYS65520:RETURN:REMPOSITIONCURSOR
```

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# Looking after the Pennies

#### by Mike Todd

Todd's Lore in the March/April issue included a look at rounding errors in the Vic's handling of numbers.

Probably the greatest area of concern over these rounding errors is with money, where the two (or three) decimal places of pence could easily be distorted with catastrophic results.

The easiest way to solve this one is to work in pence all the time and only convert to a true decimal fraction when printing the results. This way, you'll not lose any accuracy - provided that you don't exceed the Vic's upper limit of accuracy, which is nine figures and gives a practical upper limit of 9999999.99 (ignoring half pences).

Putting all this into practice gives the following simple program:

Line 10 inputs the amount in pounds and pence (for instance 1234.56) and line 20 converts this into an ineger, avoiding rounding



problems, by multiplying by 100.0000001 instead of 100. A check is made to see if the number is within range, and an error message is printed if it isn't.

It is at this point that any manipulation on the data (now in pence) can be performed.

There are two ways of converting the result back into pounds and pence. The first is simply to divide by 100, which will work without any rounding problems and can be formatted for output fairly

It is however quite simple to convert the amount N into two

strings, L\$ containing the pounds and P\$ containing the pence. Each has a fixed length and so makes formatting on the screen very much easier.

Line 40 sets up the string of digits so that it is a fixed length, in this case nine characters long, with the length made up by adding spaces at the front.

Line 50 separates the pounds into L\$ and the pence into P\$. If the amount of pence is less than 10, the first character in P\$ will be a space and not a zero as we would normally require; therefore line 60 has to strip off this first space and replace it with zero.

Finally, line 70 simply prints out the resulting strings in the normal way; but any formatting to suit the program could be used at this

Obviously the amount can be limited even further in line 30. Then the length of N\$ in line 40 and L\$ in line 50 would be shortened accordingly.

10 INPUT N

20 N=INT(N\*100.0000001)

IF N>99999999 THEN PRINT"OUT OF RANGE":STOP

40 N\$=RIGHT\$(" "+MID\$(STR\$(N),2),9)

50 L\$=LEFT\$(N\$,7): P\$=RIGHT\$(N\$,2)

60 IF VAL(P\$)<10 THEN P\$=RIGHT\$("0"+RIGHT\$(P\$,1),2)

70 PRINTL\$+"."+P\$



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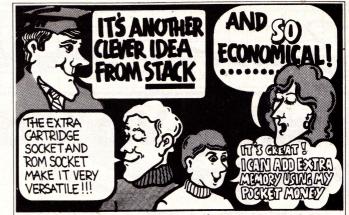
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# Visiting Vic Video Part Three

#### by Jim Butterfield

In which the traveller discovers that a character set is less important for its footage than its mileage...

It's worth making an observation about the minimum Vic here. We know that the video chip sees memory in an unusual way:

(figure here, as in previous articles)

Some users have memory expansion permanently connected to their Vic. They don't want to plug and unplug the memory units. Yet some programs call for a "minimum VIC with only 5K".

A few POKEs can reconfigure any machine to this minimum configuration. First, we set the limit of Basic:

#### POKE 55,0: POKE 56,30:CLR

And then put the screen into place (block 15.5):

POKE 36869,240: POKE 36866,150: PRINT CHR\$ (147)

This takes care of the high end of memory. It's not always necessary, but we can also set up the low end:

POKE 4096,0: POKE 43,1: POKE 44,16: NEW

#### Small character sets

A full character set of 256 characters takes up 2048 bytes of memory — there are eight bytes for each character. We have tried copying over the whole set; on a small Vic, it takes up a lot of our available RAM and starts to cramp our program space.

Can we omit some of the characters and save space? Yes we can.

Our program may not need the reverse video characters. If so, there's a savings of 1024 bytes. Be careful: reverse video is used for flashing the cursor. If you give it up, the cursor may not work in quite the same way.

But there's more. Which are the characters that we use the most? Well...the alphabetic characters A to Z, the space character naturally, and numbers 0 to 9. What luck! These characters are bunched together within the first 58 of the character set (including a few spares). 58 times 8 gives us

464 bytes of storage...not bad for a functional character set.

We could do better than this, of course, if we had a specialized display that could work from a very few characters. For example, a game might use only four characters — a ball, a ninepin, a 'gutter', and the all-important space character to give us blank areas. Even so, we might be tempted to go with the whole alphanumeric set — to display scores, instructions, and the like.

A little arithmetic shows a convenient arrangement. The character set must start on a block boundary, screen memory may start on a half-block boundary. If we put them one behind the other this would give us 512 bytes for the character set — enough for 64 characters.

In fact let's try this, with the partial character set at block 15 and the screen at its usual block 15.5. We can write a simple graphics program:

100 POKE 56,28:CLR (lower limit of Basic)
110 FOR J = 0 TO 63 (copy 64 characters)
120 J1 = J\*8 (8 bytes per char)
130 FOR K = 0 TO 7 (copy each byte)
140 POKE J1 + K + 7168,
PEEK(J1 + K + 32768)
150 NEXT K,J

Here come our custom characters. We'll draw a ship in two characters, the left half in character 27 and the right half in character 28. The 'pixels' of the drawing are in the DATA statements:

160 DATA 0,0,4,4,127, 63,31,0
170 DATA 0,0,192,192,252,
248,240,0
180 FOR J = 27 TO 28 REM
two specials
190 J1 = J\*8
200 FOR K = 0 TO 7
210 READ X:POKE J + K +
7168,X
220 NEXT K,J

Now we put our new character set in gear:

230 POKE 36869,255 240 POKE 36866,150

And we'll draw our little ship with a simple demonstration program.

Note that screen character 27 corresponds to ASCII character 91.

300 PRINT CHR\$(147);
"SHIP GRAPHIC"
310 FOR J = 2 TO 18 (left to right)
320 PRINT CHR\$(19)
330 PRINT TAB(J); CHR\$ (32);
CHR\$(91); CHR\$ (92)
340 FOR K = 1 TO 99
350 NEXT K,J
360 GET X\$:IF X\$ = ""
GOTO 300

The program ends here. Restore the regular character set with:

#### 370 POKE 36869.240

Run the program. After the initial pause for generating the new character set, a ship will move across the screen. You can adjust its speed by changing the value of 99 in line 340. The program will terminate if you hold down any key.

If you press RUN/STOP the program will break with the custom character set still in place. You'll notice the lack of a cursor; apart from that, you can type most alphanumeric characters without problems. You might like to look around to find out which keys now represent left and right halves of the ship. When you are finished playing, type CONT to allow the program to continue

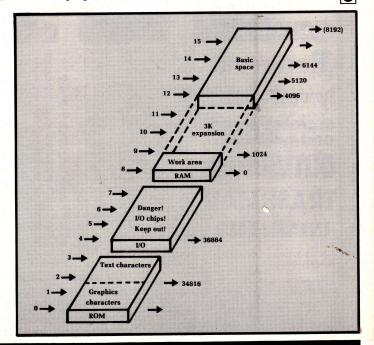
and then terminate by holding a key down.

You may notice that the program does not restore the 512 bytes that it takes for the character generator. So the character set is protected, and you can try going back to it if you wish with a POKE 36869,255. Eventually, you may wish to make the program complete by adding line 380, with a POKE 56 and CLR. I'll leave you to work out the proper details.

Here's a question that may cross you mind: if the character generator starts at block 15, whre would the video chip go for the reverse characters? They would be in the next block; but we don't hve a block 16. What happens? The video chip address 'wraps around' and we go to block 0. The character in block zero are not reversed, of course, and that's why the cursor doesn't flash.

We can do some good work with a very small character set. It doesn't necessarily have to be big to be useful.

Another thing that we have spotted in this episode: we can build effective graphic pictures by using more than one character. Our program used two separate characters which together drew a ship...but we can use three, four, six, or more as needed.



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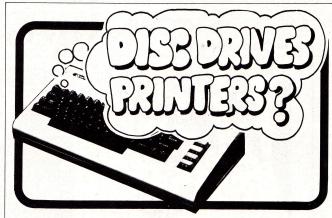


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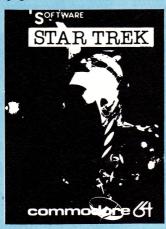
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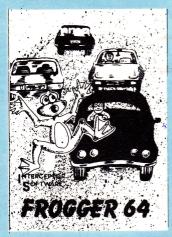
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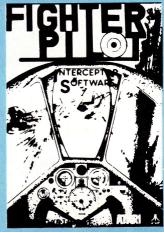


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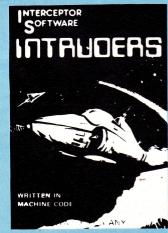








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## Directing functions keys - a note by Steve Beats

The function keys on the Commodore 64 are like the Vic's— a set of four spare keys located down the right-hand side of the keyboard. When using a Basic program it is often desirable to display a message such as 'Press F1 to continue'.

As with the Vic, the 64 makes it possible to detect these keys because each one has a CHR\$ code assigned to it: these range consecutively from 133 to 140 for keys F1 through to F8.

A simple way to wait for the F1 key to be pressed is:

#### 100 GET A\$: IF A\$ < > CHR\$ (133) THEN 100

If you don't want to use CHR\$ every time you check for a function key, however, you can use the following method.

Type a single quote and then press each of the function keys in turn; you'll see a series of reversed video graphics appear. We can use this property of the function keys to make the test loop a little easier to key in, as follows:

#### 100 GET A\$: IF A\$ < > "[F1]" THEN 100

The 'F1' in square brackets means 'press that key', not type it as shown; you should then have a

```
10C REM *** FUNCTION KEY DEFINE ***

110 REM *** ADAPTED FROM A ROUTINE ***

120 REM *** BY STEVE BEATS ***

1000 GOSUB 4000: REM POKE IN DATA

1010 F$(1)="LIST"+CHR$(13)

1020 F$(2)="RUN"+CHR$(13)

1030 F$(3)="GOSUB"

1040 F$(4)="SRVE"+CHR$(34)

1050 F$(5)="LORD"

1060 F$(6)="GOTU"

1070 F$(7)="CHR$("

1080 F$(6)="RETURN"

1090 SYS12*4096+64: REM ENABLE CODE

2000 V=12*4096-1: REM START OF DATA

2010 FOR I=1 TO 8: K=I-1: V1=V+K*8

2020 FOR J=1 TO LEN(F$(1)): REM POKE IN KEY DEFINITIONS

2030 POKE V1+J,ASC(MID$(F$(1),J,1))

2040 NEXT: NEXT: END

3000 DATA 120, 169, 87, 141, 20, 3, 169, 192, 141, 21

3010 DATAS,88,162, 63, 169, 0, 157, 0, 192, 292

3020 DATA16, 250, 96, 165, 197, 201, 64, 208, 6, 141

3030 DATAS,88,162, 63, 169, 20, 155, 192, 240, 44

3040 DATA11,192,76,148,192,205,151,192,240,5

3050 DATA22,4,785,4,18,18,18,16,16,162,0

3070 DATA3,24,785,4,18,18,18,16,164,44,5,6,3,8

4000 FOR I=0 TO 92: READ A: Z=Z+A

4010 POKE12*44096+64+I,A: NEXT

4020 RETURN
```

solid square with a line through the top of it between the quotes.

Another way of testing for the function keys (and any other keys for that matter) is to PEEK at memory location 197. This

contains a special code that tells the computer which row and

column the key being pressed is on. This location contains 64 when no keys are depressed, a different number if a key is held down.

You can use this to monitor the function keys all the time — and even wait for it to be released before continuing with the rest of the program.

The following codes are put into location 197 when each of the function keys are pressed:

F1 = 4 F2 = 5 F3 = 6 F4 = 3

For example:

10 IF PEEK(197 < > 4 THEN

 10: REM wait for F1

 20 IF PEEK(197) < > 64 THEN

 20: REM wait for release

This will wait for the F1 key to be pressed and then released before continuing with the rest of the program.

#### **User-defined function keys**

The Basic program listed here will allow you to define the function keys so that they print anything you like up to eight characters long.

Lines 200 to 330 POKE the machine code into \$C000 onwards. If the program stops at line 320 and prints the error message, you hve made a mistake in typing the data: go through it all again and check it very carefully.

If the data is POKEd in successfully, you will be able to use the function keys as if each were a single key with a word on it.

## 64 Screen editor bug

Someone at Commodore has found an irritating bug in the screen editor of the Commodore 64 which causes the machine apparently to hang up with the keyboard disabled.

It can be demonstrated by turning the 64 and your television set off then on. Now take the cursor down to the bottom line; type a line number then any characters so that they wrap around on to the next line. Press RETURN and then press INST/DEL.

Irritating, huh? There is a way to overcome this problem. Repeat the above steps: but also add one more — press CTRL and WHT.

If the bug appears for you, it is possible to recover — provided you have a Vic 1530 cassette deck. With some colour combinations it is possible (by hitting the keyboard in the correct area) to produce the PRESS PLAY ON TAPE message: when the 64 displays this, obey it — and then press STOP. Control will be returned to you without the loss of any program.

Some colours do not cause any problems: CTRL 1,2,5 and 6, and CBM 1,2,5 and 6.

But these appear to lock the keyboard: CTRL 3,4, and 7, and CBM 3,4,7,8. CTRL 8 will leave the PRESS PLAY ON TAPE message displayed.

Note that it's the character colour set at the time of the DELete that is critical and *not* the screen and/or border colours.

ADDICTION: "Computers are neat, tidy and logical . . . People talk to computers in the same way as children talk to dolls. There are not likely to be any social conflicts." So says a heavy from Brunel University, where computer junkies are worrying the bigwigs so much that some students are being rationed to five hours a day on the machines. Personally, I find my Vic has a bit more personality than my teddy: it has more jokey tricks, for a start, like absent-mindedly losing my programs for me . . .

VIC AND THE ROYALS (CONTD): At the Commodore Show a nice US

gent buttonholed your editor. Seems he represents the American company Human Engineered Software (very big, getting bigger, trying to make a splash with Vic/64 games and other programs in Europe). Seems HES was responsible for the Queen Bedroom game we castigated as "tacky". Seems HES was miffed; the game apparently is in the best possible

taste. Or was — it's been withdrawn, not because of our condemnation but because the programming wasn't up to standard.

HES does have a good reputation for the quality of its add-on software (not just games, lots of different goodies in the catalogue). If we get any review copies we'll let you know. Meanwhile Maplin has just been signed as UK agent for HES now.

Just when we were about to put this issue to bed, Commodore announced the substantial price cuts on the 64 that we've been expecting. Tough if you've already bought one: otherwise you can now have a 64 for £199.13 ex VAT, a cut of about £145. And that's the official RRP - some of the big chain stores will have the 64 cheaper.

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#### **Word Processing**

Audiogenic: Wordcraft 40

"The only real word processing package for the 64..." Derived from the highly successful and well-loved Pet Wordcraft, upgraded from the Vic-20 Wordcraft we've reviewed enthusiastically; good use of colour and function keys, excellent collection of facilities including integral mail-merge and full compatibility with other Wordcrafts. Price £89.95.

Audiogenic Ltd, PO Box 88, Reading, Berks; 0734 586334.





Commodore: Easyscript

Powerful-looking word processor with a good pedigree (actually written by Precision Software); most WP features including mailmerge, search-and-replace, headers and/or footers, 'boilerplating' from standard paragraphs. etc. Soon to be available on cartridge; currently on disk. Price £75..

Commodore: Easyspell

Companion spelling checker with 2,000 words — extended version with 32,000 costs extra — to which you can add your own. As well as highlighting possible misspellings in Easyscript texts, interesting extras include a word frequency report. Price £75.

Commodore, 656 Ajax Avenue, Slough, Berks SL1 4BG; 0753 79292.

Impex: The Word

"Highly refined, low-cost yet highperformance, friendly and professional..." Need we say more? Apparently includes all ususal goodies, with extras like French/ German versions, good search-andreplace, 'help' displays, built-in arithmetic. Price £49.95.

Impex Designs Ltd, Metro House, Second Way, Wembley, Middlesex HA9 0TY; 01-900 0999.

Kobra: Paperclip

Another product that looks good on specification — this word processor has usual facilities plus column sort, built-in maths, ascending/descending list options. Lots of single-keystroke functions. Price £86.

Kobra: SpellPro

Paperclip-compatible spelling checker with up to 80,000 words (starts with only 2,674 though). Price £69.

Kobra: MailPro

Records handler, again compatible with Paperclip and intended primarily to hold name-and-address records for automatic insertion into Paperclip-produced letters (but in fact can be used for other database applications). 254 characters and 20 fields per record, 4,000 rcords per disk. Price £69.

Kobra Micro Marketing Ltd, PO Box 28, Henley on Thames, Oxon RG9 1PF; 049 122 512.

Simple Software: Simply Write

64 version of a commendably compact and modestly priced WP sytem we reviewed favourably on the Vic-20. Despite the price, includes mail-merge and 'boilerplating' from standard paragraphs along with

most other word processing facilities. Price £35 on tape, £40 for disk. Simple Software Ltd, 15 Havelock Road, Brighton, Sussex BN1 6GL; 0273 504879.

**SPT: Quick Brown Fox** 

One of the first word processors to be announced for the 64 — and on specification one of the best. Most of the standard features, though typically implemented with easy single-keystroke commands; unusual extras include support for lots of different printers and built-in telecomms (via R\$232). Price £60. SPT Electronics Ltd, Tollesbury, Essex CM9 8SE: 0621 868484.

Supersoft: Busiwriter

Low-priced British word processor on disk or cartridge (£10 extra). Basic WP functions plus simple built-in calculations within documents — quite rare even for full-scale WP packages. Price £39.

Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ; 01-861

Viza Software: Vizawrite

Highly-rated all-British word processor with no obvious deficiencies (we're reviewing it and will let you know about that claim). Pagebased what-you-see-is-what-you-get approach; sensible use of 64's colour and graphics; features headings and footings, mail-merge for mailshotting, document merge, underline and embolden, centering, tabbing and indenting, search-and-replace; drives "virtually any" printer, can read text produced by various other WP systems. Price £69.

Viza Software: Vizaspell

Automatic checking of Vizawrite text against 30,000-word dictionary (you can add or delete words too). Price £59.

Viza Software Ltd, 9 Mansion Row, Brompton, Gillingham, Kent ME7 5SE; 0634 813780.

Wego: WordPro 3 Plus/64

The 64 implementation of the latest version of one of the world's top-selling CBM 8000 word processors. Loaded with functions. Price £80. Wego Computers Ltd, 22a High Street, Caterham, Surrey CR3 5UA; 0883 49325.

#### Spreadsheets

**Kobra: Calc Result** 

A spreadsheet calculator for the 64 that is "easier to use, easier to understand and more powerful than contemporaries". Not dissimilar to VisiCalc in feel, though it is easier and probably better (not

that VisiCalc is available on the 64 anyway). Worksheet size is 63x254 cells. Clever facilities include 'if/then/else' conditional functions, on-line 'help' display, coloured barchart option for output, and 'windowing' for up to four pages to be viewed at once. Price £109.

**Kobra: Easy CalcResult** 

Slimmed-down cartridge version omitting some facilities but retaining most. Price £69.

Kobra Micro Marketing Ltd, PO Box 28, Henley on Thames, Oxon RG9 1PF; 049 122 512.

Marketing Micro Software: Practicalc

"The first professional spreadsheet for 64 owners..." Financial and statistical computation in the characteristic bookkeeper's spreadsheet layout at a modest price; features sorting, fast searching, four-colour display, 20 possible mathematical operations. Price £30. Marketing Micro Software, Goddard Road, Whitehouse Industrial Estate, Ipswich, Suffolk; 04373 462721.

Supersoft: Busicalc

"At last a spreadsheet program so simple you won't need a degree to understand it..." Financial and statistical computation in the characteristic bookkeeper's spreadsheet layout at a modest price. Price £39 (cassette) or £40.50 (disk).

Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ; 01-861

#### **Records management**

Audiogenic: Magpie

Database manager with some advanced features, including built-in maths and word processing, neat 'pop-up' menus of options at each stage, completely user-defined record and report formats (records can be up to 6,000 characters long!). Comes on cartridge, so a single disk need not be a disadvantage. Price £99.95.

Audiogenic Ltd, PO Box 88, Reading, Berks; 0734 586334.

Gemini: Mailing List

Modest price, great claims made for this cassette-based "dedicated database" — search for name-andaddress records via up to 10 userdefined parameters, print labels in a variety of formats. Price £19.95.

Gemini: Database

Economical general-purpose database system using cassette — "can be used in place of any card index application"; features sorting, searching, selective print. 'due for payment reporting'. Price £80. Gemini Marketing Ltd, 9 Salterton Road, Exmouth, Devon EX8 2BR; 03952 5832.

Impex: Inquire-Pac

Up to 200 records, 15 fields and 250 characters per record — user-defined formats, of course. Claims fast access, searching selection; conditional sorts by up to three fields. Price £39.95.

Impex Designs Ltd, Metro House, Second Way, Wembley, Middlesex HA9 0TY; 01-900 0999.

#### Kuma: Solid State Cassette Database

'Solid State' is just the brand name; this isn't a cartridge. This low-priced records handler allows 255 records per tape, up to 10 fields per record; facilities including browse, search/sort and print, calculate — plus automatic splitting of files that are becoming too big. Price £24.50. Kuma Computers Ltd, 11 York Road, Maidenhead, Berks SL6 1SQ; 0628 71778.

**Precision Software: Superbase 64** 

New records management system — a slimmed-down version of a high-grade database package for the CBM 700 but retaining similar features (integral 'help' displays, fast access to records, fast sort and select, easy amendment with redefinable record formats, built-in spreadsheet capabilities, etc). Up to 1,000 characters and 128 items per record. Price £100.

Precision Software Ltd. Park House, 4 Park Terrace, Worcester Park, Surrey KT4 7JZ; 01-330 7166.

**Rabbit Software: Infomast** 

Database manager — "the most advanced information control program for the 64". Certainly sounds good: 30 fields (including 'date' type as well as numeric and alpha) and 255 characters per record, 669 records per disk. Lots of ways of accessing records for search/sort/select, and there's built-in word processing and calculation. Price c79

Rabbit Software Ltd, 380 Station Road, Harrow, Middlesex HA1 2DE; 01-863 0833.

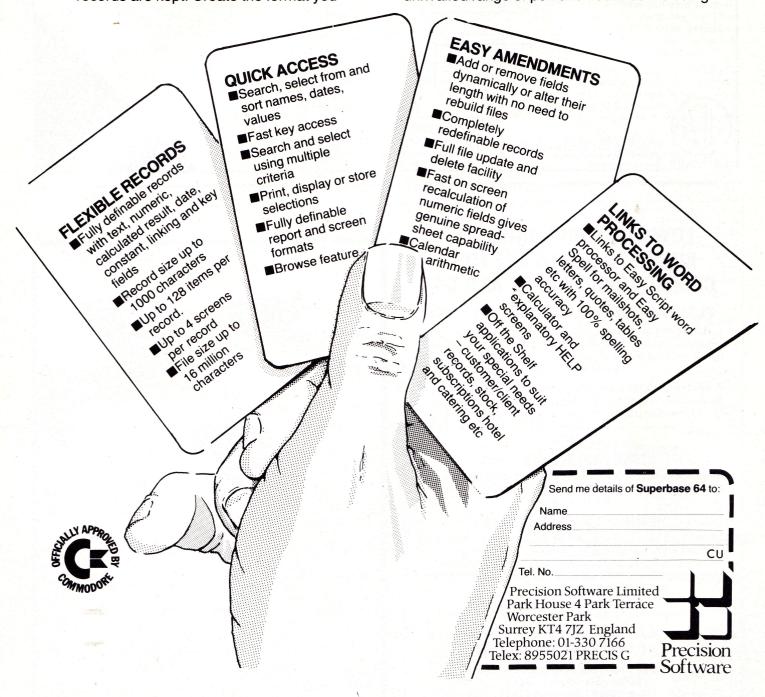
#### Stage One Computers: Microfiler 64

New records management system from a supplier with a range of widely-used and well-liked records storage package for larger computers. Claims simplicity in use, all types of records, multi-criteria search-and-select. Reports can include automatic mathematical operations. Price £60.

Stage One Computers Ltd, 300 Ashley Road, Upper Parkstone, Poole, Dorset BH14 9BZ; 0202 735656.

# Strengthen your hand with Superbase 54

The complete information control system for the Commodore 64. Ideal for any home, business or professional environment where records are kept. Create the format you need and enter your records. If the layout or data field sizes are not quite right, correct them and carry on. Superbase gives you an unrivalled range of powerful features including:





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Vizawrite 64 is a disk-based word processing program — it is available NOW from your local Commodore dealer or direct from Viza Software. It costs just £69.00 plus VAT (£79.35).

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There were some people who doubted that the Fourth Commodore Show in June would be a success.

It was costing the exhibitors more than ever before to be there: Commodore itself organised the thing, and wherever else Commodore's experience lies it certainly isn't a professional show organiser: the Computer Fair was being held the next week: the micro business is going through some hefty changes, particularly with the arrivals of price-cutting multiples like Dixons and Rumbelows at the Vic/64 end of things...

In the event the Show was generally A Good Thing. The air conditioning didn't break down too often, 16,000-plus punters seemed happy, the exhibitors weren't moaning any more than all exhibitors do, the PA was forever entertaining ("Michael Hilton, please go back to the toilet"), and we had a good time. After all we met lots of you.

Pick-up: If there was one product we'd have liked to take home, we could have done so without breaking any backs (or rather we could have if there'd been more than one in the country). It's the portable 64 — legible 5in colour screen, one or two 170K floppies, just over 27lbs, standard 64 sound and colour.

We were a bit disappointed though with the prices (£695 for one disk, £895 for two) and the delivery dates — on different visits we were told "September", "November" and "January"...

Honeyed words: Honeyfold kept coming over to our stand to compliment us on our review of its Dr Watson 'learn assembler' kit. There's a 64 version now and both were selling fast at the Show.

So was a £19.95 payroll cassette that we'll be reviewing and also going well was a cheap Vic carrying case — 'handy' rather than 'rhino-proof' is the best description, but for £13.80 you can't complain...

Stacked up: Stack also had a crowded stand (on both sides of the counter — it looked as though the entire company was taking a weekend in the Big City) with lots of goodies. Along with the latest clutch of ROMs there's a new analogue joystick and what seems to us to be the best value in Vic/64 lightpens currently on offer...

Gamespersonship: Lots of new games at the Show, and lots of good new games. Stack actually had a couple of its own to demonstrate the lightpen—fairly conventional, but at least they weren't yet more essays in Kill/zap/blast/destroy.

Elsewhere the standard is definitely improving. When we could get near the joysticks we especially liked the latest crop from the established guys — Anirog (especially '3D Time Trek'), Audiogenic ('Choplifter' is on the Vic too, now, but the 64 version is still best), Rabbit (check out the very clever scenario in 'Escape').

The man Minter at Llamasoft has come up trumps again with the wonderful 'Attack of the Mutant Camels'. Mind you we're still trying to beat 'Gridrunner', which apparently has reached the Hot

Cakes stage saleswise in the States now.

The two best games though were Audiogenic's 'Alice in Videoland' and Commodore's 'Soccer' for the 64. The graphics on these are streets ahead of anything else we've seen outside the arcades. The soccer game you can buy, but Audiogenic was only running a demo version of 'Alice' - seems it had just arrived from the States in a distinctly uncompleted form but Audiogenic's people were so impressed they just had to have it there. It's much too big to fit into memory all at once: you need a disk, and the game takes up most of the 150K available...

New From Slough: Commodore had its own-brand software stand concentrating on packages for the 64; also showing was Simon's Basic though we didn't get to see it written by 16 year old David Simon, provides 114 extra Basic commands on a cartridge. The Commodore Education stand featured the new speech module for the 64 (235 words spoken in a "pleasant female voice", supports games cartridges, can be programmed direct from Basic or Assembler and mixed with music and graphics).

Busy on business: More impressive than the new games though was the number of people downstairs in the 'personal computer' bit who had business-oriented software for the 64. Apart from Commodore itself (Easyscript and Easyspell) we were impressed with Viza

Software's directly competitive Vizawrite word processor and Vizaspell word processor — clean and clear.

Then there's a clutch of good-looking records handling packages like Precision Software's Micro-Base, Audiogenic's Magpie (the 64 version of Wordcraft is out too), and Rabbit's interesting Infomast. Quite a few 64 accounting packages at the Show, too. The 64 will surely sell well as a low-cost business machine...

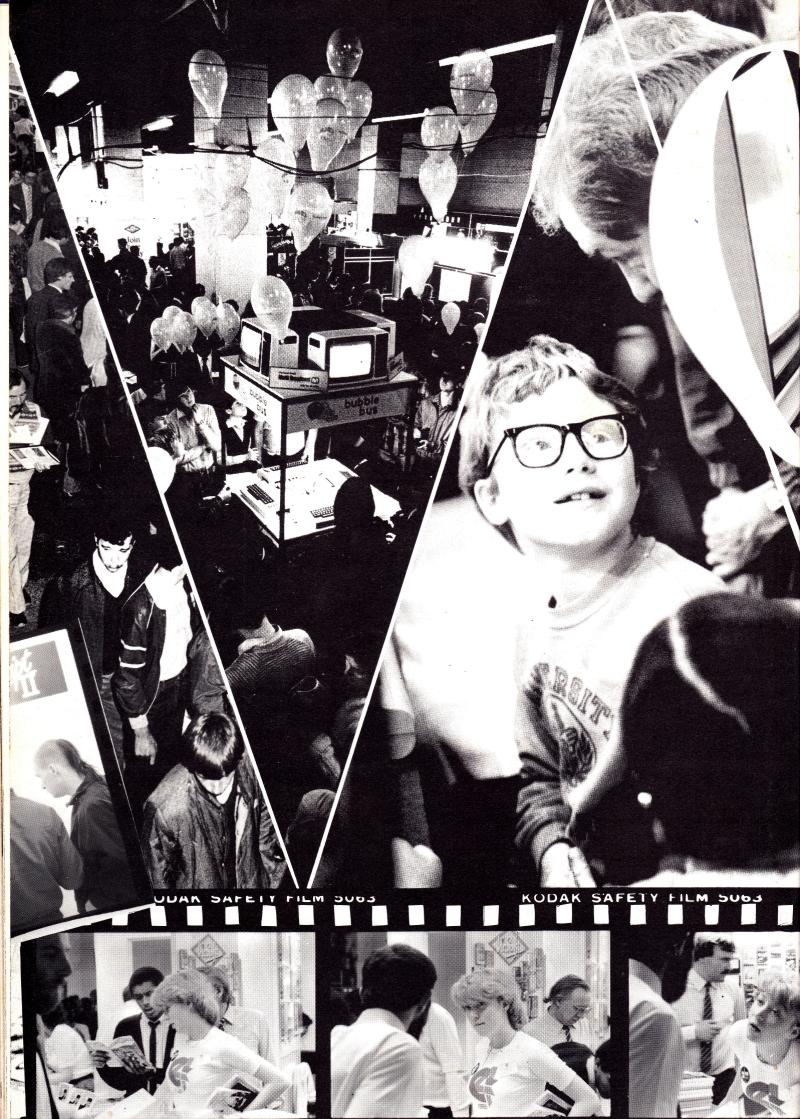
Any conclusions to be drawn after this snapshot of the Commodore world? Well, the Vic looked established and the people who produce software for it are obviously maturing in their techniques — but there aren't too many new ideas around, especially for 3.5K games.

The 64 is shifting from the 'promising' grade into 'exciting', with several products on view that utilise the thing's capabilities (especially all that memory). On the other hand, there were a good few 64 packages and games there that patently don't make the most of the 64.

The 64 is where all the action is going to be now, though. That was clear from Commodore's emphasis and conversations with the principal independent suppliers. There again, we expected to see many more addons: a Vic emulator, a Pet emulator, cheap and clever hardware extras, networking...

Commodore itself did well in putting over the image of a solid, professional company when it comes to marketing. And ultimately that bit of image promotion may turn out to be the most important result of the Show.









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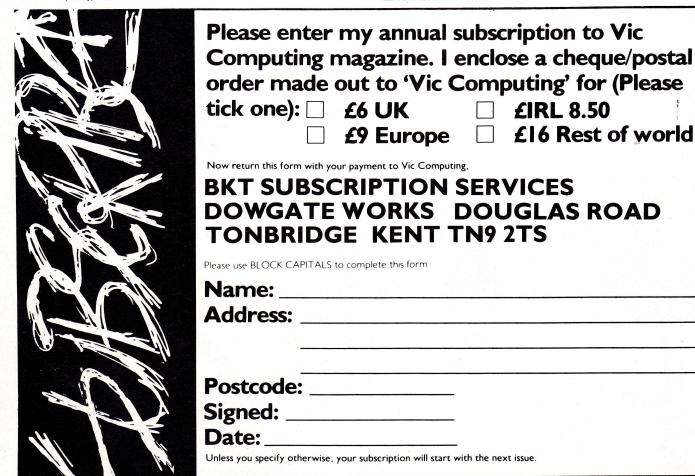
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# **Expanded Editor**

## DIY character editor modified for 8K+

#### by Bill Buck

The DIY Character Editor in the April and June 1982 issues allows you to create your own graphics. But it only runs on an unexpanded Vic. If you want your own high-resolution graphics on an expanded Vic, try this offering.

After purchasing my 8K memory expansion unit from Audio-Computers of Southend (great value!) I plugged it in and wrote a one-liner to check all the bytes: then — euk! No graphics. There is nowhere to put the graphics characters without wasting 3.5K of memory.

But along came Mike Todd in the August issue, and presto:

#### POKE 642, 24; start of Basic POKE 648, 20; start of screen SYS 64824

This moves the screen memory to 5120-5626, with Basic starting at 5632, and leaves room from 4096 to 5119 for 128 lovely hi-res characters. (The normal value in location 36869 is now 208, not 240, and so the new POKE value to use these characters is 220, not 252

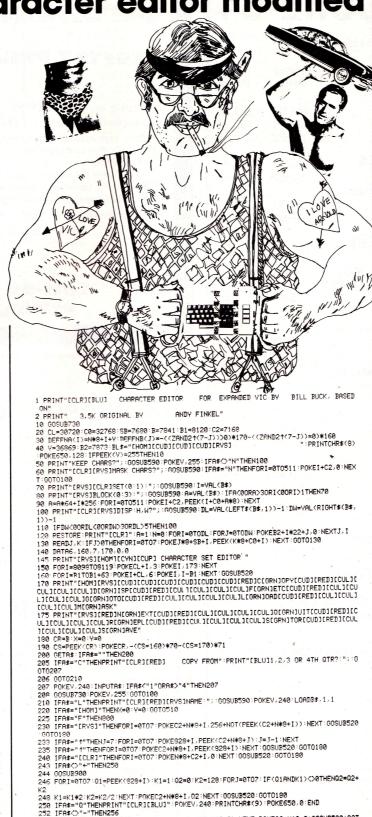
You would think that 128 characters was more than enough for any self-respecting program, Basic or machine code, wouldn't you? So did I — until I got halfway through writing a Scramble — type game in machine code. When using smooth — flowing graphics (as opposed to the normal juddering character by-character movement), it can take 8 or even 16 different character shapes to describe just one final character moving in one direction only.

I therefore decided that the full 256 characters should be available, so the commands to set up the system become:

#### POKE 642,26; start of Basic POKE648,24; start of screen SYS 64824

This now moves the screen memory to 6144-6650, with Basic starting at 6656, leaving room for all 256 possible hi-resolution characters between 4096-6143. (The normal value in location 36869 has now changed to 224, so the new POKE value to use these characters is 236.)

The colour RAM is still located at 37888-38399.



FORI=6T00STEP-1:POKEC2+N\*8+I+1,PEEK(C2+N\*8+I):NEXT:POKEC2+N\*8,0:GOSUR520:GOT

GOSUB900 FORI=0T07:POKEC2+N#8+I;(PEEK(828+I)/2):NEXT:00SUB528:00T0188 IFA#<>"("ANDA#<)"9"THEN268 It is useful to draw up a screen grid showing the new character locations so that programming difficulties are eased.

Now to define the new characters.

Even with minor modification Andy Finkel's editor will not run at this new location: it relies on the fact that in normal hi-res mode the reverse of a character will print the actual character. When the screen position is moved, this is no longer true.

I got round this problem by using the following sequence, which must be performed before the New Editor is loaded:

#### POKE 642,32; start of Basic POKE 648,30; start of screen SYS 64824

This locates the screen at 7680 as usual and the program locates from 8192 up. The normal workspace of 7168-7680 is also available.

The modified editor has the facility of splitting the 256 characters, which eventually occupy the 2K of memory from 4096 to 6143, into four quarters - each of these 64-character segments fitting into the workspace at 7168-7679, one at a time. Two new commands are provided to shift character sets into and out of the workspace, and a special FETCH command enables a character from anywhere in the 2K to be copied into the current character space on screen (invaluable for getting a character from one quarter to another).

Each quarter may be saved as a separate file by naming the file 1xxxx, 2xxxx, 3xxxx or 4xxxx respectively.

If the filename begins with "&", the file is saved directly to disk at 7168-7679 from the work area; and if it begins with any other character, the file is saved to tape at 7168-7679 (as in the original editor). The one exception to this is if the filename begins with a "%", when the whole 2K is saved to tape at 4096-6143.

I have also found a need to modify characters by inverting or mirroring; or, when defining characters for smooth movement, by shifting up, down, left or right by one row of pixels at a time. This is accomplished using keys '1', '-', '+', '-', '(', and ')'.



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A listing of the new facilities follows: all the facilities of the original editor are retained.

Note: When entering the program or changes to your existing programs, some lines may be longer than 88 characters, and must be typed using the short form of the command words see Appendix D of the Vic user's guide. Also, the original line numbers must be changed to allow insertions: multiplying by 10 is the easiest solution.

#### **New facilities**

- gives a mirror image of the selected character
- ..inverts the selected character
- .moves the selected character up by one row of pixels
- ...moves the selected character down by one row of pixels

.moves the selected (or 8 character to the left by one column of pixels

.. moves the selected lor 9 character to the right by one column of pixels

#### The new Function commands

S tore or save

After the 'Store/Save or List?' question is answered with an S", the Vic requests the filename.

- Filename 1xxxx moves, the working file to 4096-4607
- Filename 2xxxx moves the working file to 4608-5119
- Filename 3xxxx moves the working file to 5120-5631
- Filename 4xxxx moves the working file to 5632-6143

The Vic then asks 'Save?', and a "Y" response causes the file to be saved to tape with a header specifying that the file will always load starting at the location moved to. an "N" response continues the program at line 180.

- O Filename &xxxx saves to disk from 7168 to 7679 directly
- Filename xxxxx saves to tape from 7168 to 7679 directly

. with a header ensuring that the file loads starting at 7168.

Filename %xxxx leaves the file in workspace alone and saves the 2K of memory from 4096 to 6143 as a 2K file with a header ensuring that the file loads starting at location 4096. This is the best method of saving the file.

265 GOSUB900
265 FORT=BTO7:01=(PEEK(\$28+I)\*2):IFQ1)255THENQ1=01-256
267 POKEC2+H\*8+I.Q1:NEXT:GOSUB520:GOTO180
268 IFB\*C'"S"THEN360
268 IFB\*C'"S"THEN360
278 POKEV, 240:PRINT"[CLR][RED]S[GRN]TORE/[RED]S[GRN]AVE OR [RED]L[GRN]IST?";:GOS
UB590:IFB\*="S"THEN360
280 C\*="""-H=3:RRINT"TO PRINTER?";:GOSUB590:IFA\*="Y"THEN4=4:C\*="[CLR]"
290 OPENA, A:FORI=0TO62STEPS:PRINT"[CLR]":FORJ=0TO7:PRINT#4,C\*"]DATA"STR\*(I+J);:FORP=0TO7

RH=01U/ 300 PRINT#4,","MID\$(STR\$(PEEK(A+C2+(1+J)\*8)),2);:NEXT:PRINT#4:NEXTJ 310 IFC\$=""THENPRINT"[CUDJHIT RETURN":GOSUB590 320 HEXTICLOSE4:POKEV.255:GOT0120 320 PRINT"FOR STORE, IMPUT 1,2,3 OR 4TH QTR - FOR SAVE, INPUT NAME: 1,2,3,4,%,&

OR OTHER : 331 A=1:POKE172,0:POKE173,28:POKE174,0:POKE175,30:POKE193,0:GOSUB590:IFA\$="%"THE

331 He1: PDKE172, 8'-PDKE173, 28'-PDKE174, 8'-PDKE175, 38'-PDKE193, 8'-DUSD398'-IFFFF 3' HE NA=8
332 PDKE194, 28'-C4="Y": IFFR#="1"THENPOKE175, 16'-PDKE175, 18'-PDKE194, 16'-GDSUB708
333 IFFR#="3"THENPOKE173, 16'-PDKE175, 22'-PDKE194, 18'-GDSUB723
334 IFFR#="4"THENPOKE173, 16'-PDKE175, 24'-PDKE194, 28'-GDSUB723
335 IFFR#="4"THENPOKE173, 16'-PDKE175, 24'-PDKE194, 28'-GDSUB726
338 IFFR#="4"THENPOKE173, 16'-PDKE175, 24'-PDKE194, 16'-GDT0348
339 IFC#C-"Y"THENPOKE1, 25'-GDT0188
340 PDKE196, A'-PDKE183, LENKB\$)
345 FORT=1TOLENCB\$) -PDKE8191, ASC(MID\$(B\$, I, I)):NEXT
356 PDKE187, 52'-PDKE188, 3'-PDKEV, 248'-PDKE185, 1'SYSG3189'-PDKEV, 255'-GDT0188
376 FORT=3TDDL: FDRJ=8TDDW: Z=B2+I\*22+J: Z1=PEEK(Z): PDKE2+DL: 4'-PDKEZ, 78'
386 PDKE187, S2'-BNEXTJ, I'-GDT0288
480 IFR#="N"THENPOKECL+B1+N, 6'-N=N+(N-C\$3): GDSUB528'-GOT0188
481 IFR#="N"THENPOKECL+B1+N, 6'-N=N+(N-C\$3): GDSUB528'-GOT0188
481 IFR#="M"THENPOKECL+B1+N, 6'-N=N+(N-C\$3): GDSUB528'-GOT0188
483 IFR#="M"THENPOKECL+B1+N, 6'-N=N+(N-C\$3): GDSUB528'-GOT0188
4840 IFR#="M"THENPOKECL+B1+N, 6'-N=N+(N-C\$3): GDSUB528'-GOT0188

. IFA\$="R"THENGOSUB570:FORI=0TO7:POKEN\*8+C2+I.PEEK(C2+A\*8+I):NEXT:GOSUB520:GOT

U189
439 IFA\$="G"THENPOKER1+N+CL,6:00SUB570:N=A:GOSUB520:GOT0180
449 IFA\$=" "THENPOKECR,70:POKEFNA(C2).PEEK(FNA(C2))RND(255-21(7-X)):A\$=""CUR1"
450 IFA\$="\*"THENPOKECR,71:POKEFNA(C2).PEEK(FNA(C2))OR(21(7-X)):A\$=""CUR1"
450 IFA\$="\*"THENPOKECR,71:POKEFNA(C2).PEEK(FNA(C2))OR(21(7-X)):A\$=""CUR1"

ERIOJ: 590 POKEBI+N+CL.7:POKESB+362+CL,6:POKESB+362,N:RETURN 590 PRINT"(EV-SICHOMICCUDICCUDICCUDICBLUISRT#:CHR#?"):GOSUB590:A=VAL(LEFT\$(B\$,1)) #256+VAL(MID#(B#,3)) 595 IFA-951:ORACOTHEN550

570 PRINT"[RVS][HOM][CUD][CUD][CUD][RED]CHAR#?[BLU]"):GOSUB590:A=VAL(B\$):IFA<00R

568 GGTOS88
570 PPINT\*IPWS]IHOMICUDICUDICUDICUDICHEDICHAR#?[BLU]";:60SUB598:A=VAL(B\$):IFA(80RA)
8>68 PPINTEL\$:8CTURN
590 B\$="
600 GGTA\$:IFA\$=""THEN608
610 IFASC(A\$)=28AHENPRINT:A\$=LEFT\$(B\$,1):RETURN
629 IFASC(A\$)=28AHENPRINT:A\$=LEFT\$(B\$,1):RETURN
629 IFASC(A\$)=28AHENPRINT:A\$=LEFT\$(B\$,1):RETURN
620 IFASC(A\$)=28AHENB\$=LEFT\$(B\$,1EK(B\$)-1):PRINT\*[CUL] [CUL]";:60T0608
630 IFASC(A\$)=28THENB\$=LEFT\$(B\$,1EK(B\$)-1):PRINT\*[CUL] [CUL]";:60T0608
630 IFASC(A\$)=28THENB\$=LEFT\$(B\$,1EK(B\$)-1):PRINT\*[CUL] [CUL]";:60T0608
650 B\$=B\$+A\$:PRINT\*[RV\$]INOVING FILE"
710 FORI=4096T04607:POKEI,PEEK(I+3072):NEXT:00T0750
720 PPINT\*[RV\$]INOVING FILE":FORI=5582T06143:POKEI,PEEK(I+2568):NEXT:00T0758
723 PRINT\*[RV\$]INOVING FILE":FORI=5582T06143:POKEI,PEEK(I+2548):NEXT:00T0758
724 IFA\$="""ORBA\$="""THENDI=2942:00T0748
725 IFA\$="2""THENDI=2942:00T0748
726 IFA\$="2""THENDI=2942:00T0748
727 IFA\$="2""THENDI=2942:00T0748
728 IFINT\*"""THENDI=2942:00T0748
729 RETURN
740 PRINT\*[ORDING FILE":FORI=168T07679:POKEI,PEEK(I-DI):NEXT
745 PRINT\*[CNDING FILE":FORI=168T07679:POKEI,PEEK(I-DI):NEXT
746 PRINT\*[CNDING FILE":FORI=108T07679:POKEI,PEEK(I-DI):NEXT
747 PRINT\*[RV\$]IOUPIFILE MOVED\*:INPUT\*SRVE\*];C\*:RETURN
750 PRINT\*[CNDING FILE":FORI=108T07679:POKEI,PEEK(I-DI):NEXT
745 PRINT\*[CNDING FILE":FORI=108T07679:POKEI,PEEK(I-DI):NEXT
746 PRINT\*[CNDING FILE":FORI=208T07679:POKEI,PEEK(I-DI):NEXT
747 PRINT\*[CNDING FILE":FORI=208T07679:POKEI,PEEK(I-DI):NEXT
748 PRINT\*[CNDING FILE":FORI=208T07679:POKEI,PEEK(I-DI):NEXT
749 PRINT\*[CNDING FILE":FORI=208T07679:POKEI,PEEK(I-DI):NEXT
740 PRINT\*[CNDING FILE":FORI=208T07679:POKEI,PEEK(I-DI):NEXT

800 PRINT"(HOM)[CUD][CUD][CUD][CVD][EPD][TRED][TREP][TRED][TREP][T

NB. The x's in the filename may be any character, or be omitted altogether.

A verify sequence may be carried out after a file is saved to tape. To do this, use the Ouit command then verify in the normal way. The program can then be re-run with no loss of characters.

After requesting this facility, the Vic asks which quarter you require, 1,2,3, or 4. The relevant section is then copied into the workspace and displayed on the screen, overwriting the existing characters. This enables all the characters to be created, modified, etc. within the 2K file.

As only one quarter of the file (64 characters) may be observed at any one time, this command is required to allow a character in any quarter to be fetched into the current character position on the screen. This is much the same as the Mask command getting a character from the Vic's own character set.

When the command is executed, the Vic asks which quarter of the 2K contains the character you require. Enter "1", "2", "3" or "4". The Vic then requests the character number, 0 to 63. The required character will then replace the current character. If you don't know the number of the character you require, you will have to Copy the relevant quarter into the workspace (after Storing the current quarter if changes have been carried out), note the number (yes, you have to count them, or use the goto sequence), then Copy the original set back into the workspace.

The Vic requests the filename, then loads the file into the relevant locations (depending on the location stored in the file header on the tape). A file beginning with '1', '2', '3' or '4' will load into the correct quarter of the 2K memory area; and the Vic then copies it to the workspace and displays it on the screen.

A file beginning with '%' loads into the whole 2K area, and the first quarter is copied into the workspace. A file beginning with any other character will load directly into the workspace.

Existing 512-byte files containing high-resolution graphics for unexpanded programs can thus be moved easily and run on an expanded system.

D isplay

This command has not been changed as such, but the display area on the right-hand side of the screen can now be up to four characters wide and six characters deep.

#### Using your new characters

The characters can be loaded before the program, followed by NEW to reset the pointers: then load and run the program.

Alternatively, the characters may be loaded after the program - in which case no corruption of the pointers into memory takes place. A third option is to use a Load command within the program to load the character file, which should have been saved directly after the program on the tape. Remember that after a 'load' command within a program, the program runs from the beginning, and an escape route must be coded by checking for loaded information to stop the Load from being repeated.

When you see	It means	You type
[HOM]	Cursor home	HOME
[CLR]	Clear screen	CLR (shift + HOME
[INS]	Insert	INST (shift + DEL)
[CUP]	Cursor up	1
[CUD]	Cursor down	1
[CUL]	Cursor left	-
[CUR]	Cursor right	-
[BLK]	Switch to black	CTRL + 1
[WHT]	Switch to white	
[RED]	Switch to red	
[CYN]	Switch to cyan	
[PUR]	Switch to purple	
[GRN]	Switch to green	
[BLU]	Switch to blue	
[TEL]	Switch to yellow	
[RVS]	Reverse on	CTRL + 9
[RVO]	Reverse on	CTRL + 0
[F1]	Function key 1	
[F2]	Function key 2	f2
[F3]	Function key 3	f3
[ <b>F4</b> ]	Function key 4	f4
[ <b>F5</b> ]	Function key 5	f5 *
[ <b>F6</b> ]	Function key 6	f6
[F7]	Function key 7	f7
[F8]	Function key 8	f8

# How to type in Victuals

# Analogue Clock by Trevor Starr

WE've carried a couple of programs for putting a digital clock on the screen, but most people seem to prefer to look at the traditional-style analogue clock with hands moving around a face. If you have a Super Expander, this code from Trevor will give you a reasonable facsimile.

To operate, type in the time as you would for TI\$ — for example, "081045. Press the return key when the time is precisely correct and the Vic will draw and display a full-screen analogue clock.

Note that you can't expect a 24-hour clock — the program won't let you enter a time greater than 115959.

```
1 REM *** ANALOGUE CLOCK ***
2 REM *** BY TREVOR STARR ***
3 REM *** FOR SUPER EXPANDER ***
 100 GOSUB410
 110 GOSUB240
 120 IFTI$>"115959"THENTI$="000000"
130 T$=TI$
           IFTI$>"115959"THENTI$="000000"
 150 IFT$=TI$THEN150
 100 R=VAL(RIGHT#(T#.2)):DRAM0.500.500TOA(R.0).A(R.1):R=VAL(RIGHT#(TI#.2))
170 DRAW2.500.500TOA(R.0).A(R.1)
 190 H=VAL(LEFT$(T$,2))$5+M/12:1=VAL(LEFT$(TI$,2))$5+N/12
210 DRAW0.500.500TO(A(H.0)+500)/2,(A(H.1)+500)/2
220 DRAW2.500.500TO(A(I.0)+500)/2,(A(I.1)+500)/2
 240 DIMA(59,1):FORE≈0T059:READA(E,0),A(E,1):NEXT
 250 COLORS,2,2,0 REM CLOCK FACE COLOR
260 GRAPHIC2:CIRCLE2,505,505,490,490:PAINT2,0,0
270 CIRCLE0,505,505,500,500
 280 REGION4:REM NUMBER COLOR
290 CHAR2,9,"12"
300 CHAR3,5:"11 1":CHAR
310 CHAR6,2,"10 2
                                                               1":CHAR9,1,"9
2":CHAR13,3,"8
 310 CHMR6,2,"10 2"-CHMR13,3
320 CHAR16,6,"7 5":CHAR17,10,"6"
330 REGION0:REM HANDS COLOR
  340 DATA500,250,525,257,550,263,575,270,600,276,625,283,643,301,662,320,680,338,
  350 DATA717,375,724,400,730,425,737,450,743,475,750,500,743,525,737,550,730,575,
 724,600
360 DATA717.625,699,643,680,662,662,680,643,699,625,717,600,724,575,730,550,737,
 370 DATA500,750,475,743,450,737,425,730,400,724,375,717,357,699,338,680,320,662,
  380 DATA283,625,276,600,270,575,263,550,257,525,250,500,257,475,263,450,270,425,
 390 DATA293,275,301,357,320,338,338,320,357,301,375,283,400,276,425,270,450,26
  400 RETURN
 410 COLOR2.5.1.0:PRINT"[CLR] #/#LF1/~ ~LF~";CHR$(14)
420 PRINT"[CUD] IY I. #TARRECUD]"
430 PPINT"[CUD]TLEASE ENTER THE TIME AND PRESS '~T /~//
                                                                                                                                                                  TO START CLOCK."
 448 PRINT"[CUT1 (LORMAT: INV
450 INPUTT$:IFLEN(T$)<>6THENRUN
             TREDITATION TO STANDARD TO THE STANDARD THE 
   480 TI$=T$ RETURN
```

robustness and reliability were excellent... a really good feel to the action... a pleasure to use... not one game failed to load... nice professional Ilike it... very impressed EXTRACTS: J.D. COLLINS GIANT TEST VICCOMPUTING (Vol. 2 Issue 5 June, '83)

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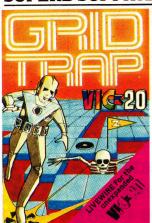
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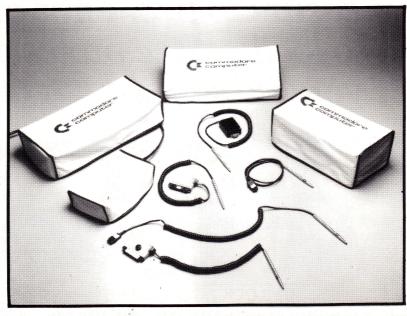


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"It has great graphics, sound effects, and music. The action is very fast £6.99 U.S. Compute Mag. Feb. 83

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Brilliant! You are like Pacman, down in the maze in three dimensions. Race down the corridors dodging the ghosts and gobbling up the energy dots. Radar screen also provided to guide you around.



"The graphics are extremely fast and superbly done" £9.95 U.S. Compute Magazine. Feb. 83

Race against the clock. Fly you starship through the maze of Tri, an abandoned space station. You must rescue some scientists before the station hits the sun. Activate your shields and conserve your fuel through 4 screen levels.

"This game is exceptionally well done. The graphics are great. The action is fast. The sound effects are good." U.S. Compute Magazine. Feb. 83

Programs Available From

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#### STD 5k VIC. Key or Joystick

Blast the centipede while dodging the Spiders amongst the toadstools.

The Vic version of the famous arcade game. Machine Code.

"One of the best games I've ever seen for VIC. Exterminator is an absolute marvel! The graphics are fantastic. Unbelievably fast U.S. Compute Magazine Feb. 83

All machine code, accelerate towards the on coming traffic while dodging from lane to lane. Joystick steers and accelerates. Program keeps five £9.95 highest scores. Excellent use of graphics.

#### STD 5k VIC. Key or Joystick

Escape the ghosts while eating the energy pills. Choose either one or three ghosts in this classic £6.99 arcade game

To: Vision Store, 3 Eden Walk Precinct, Kingston-on-Thames, S	urr	еу	
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34



More international input — Risto is a student from Finland. Othello King is one of the best versions of the widely known and very ancient board game Othello that we've seen from a non-professional ... and what's more it runs on an unexpanded Vic.

The display is good and clear, you get to choose whether you or the Vic goes first, and for Vic's move there is a depressing little display

that shows all the possibilities it's considering before it commits itself. There are three levels of difficulty, with Vic looking one, two or three moves ahead and respective time limits of about 10 seconds, one minute and 15 minutes per move.

You play by specifying the square you want to move to in terms of board co-ordinates (there's an 8x8 grid, with letters along one side and numbers down the

other). Type the letter and then the number of the position you're moving to, then RETURN. The program won't accept any illegal moves, but it will let you try again if you attempt one; if you don't have a legal move hit RETURN to skip your go (be warned: the Vic doesn't check whether you do have a legal move!). You can give up at any time by typing QUIT.

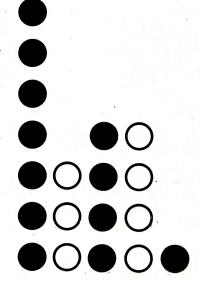
It's a long program, but persevere: if you're interested,

the results we think are worth it. The programming is clever, too those involved in coding will spot the 'minimax' tree searching.

It takes around 3,300 bytes. If you want to add extras (Risto suggests problem-setting, storing unfinished games on tape, etc) you should modify line 75 and add new code after line 1000. For that you might have to add some more memory, though, and there are quite a lot of POKEs that will then have to be changed.

### 

INFN": R=RND(-TI #="N"THENSER 200 POKE38422,5:POKE38423.5 210 P=1:INPUT"[CUD] YOUR MOVE";T\$:T\$=RIGHT\$(T\$,2):X=ASC(LEFT\$(T\$,1))-64:Y=VAL(R IGHT\$(T\$,1)) 220 ON-(T\$="IT")-2\*(T\$="IP")GOT0670,360 230 IFX>0ANDX<9ANDY>0ANDY<9THENIFBX(X,Y)=0THENC=0:M=0:GOSUB310:IFCTHENGOSUB250:G 240 GOSUB300:GOTO210
250 PRINT"[HOM]";:FORR=1TO8:PRINT" ";:FORS=1TO8:IFBX(S,9-R)=0THENPRINT"[RED]. " . 260 IFBX(S,9-R)=1THENPRINT"[WHT]● "; 270 IFBX(S,9-R)=-1THENPRINT"[GRN]O "; 280 NEXT:PRINT"[YEL]"9-R:PRINT:NEXT:PRINT"[CUD][YEL] ABCDEFGH \*[CUD]":N -N-1: IFN>0THENRETURN CONTICUNTCONTICUNTCONTICUNTCONT CUPICUPI":RETURN
310 FORR=-1T01:FORS=-1T01:F=1:TFB%(X+R,Y+S)=00RB%(X+R,Y+S)=PTHEN340
320 F=F+1:IFB%(X+F\*R,Y+F\*S)=-PTHEN320 330 IFB%(X+F\*R, Y+F\*S)=PTHENB%(X, Y)=P:FORC=1T0F-1:B%(X+R\*C, Y+S\*C)=P:GOSUB350:NEXT 340 NEXT: NEXT: RETURN 350 X2(M(L),L)=X+R\*C:Y2(M(L),L)=Y+S\*C:M(L)=M(L)-(M=1):RETURN 360 M=1:P=-1:L=0:A=0:S1=-500:GOSUB300 FORX1 = 1TO8: FORY1 = 1TO8: IFBX(X1, Y1) THEN390 X=X1:Y=Y1:C=0:M(0)=0:GOSUB310: IFCTHENONGGOTO410, 410, 650 NEXT:NEXT: IFATHENX=0:Y=B:M=0:GOSUB310:GOSUB250 400 GOTO210 410 P=1:L=1:S2=500 FORX2=1T08:FORY2=1T08:IFB%(X2,Y2)THEN440 X=X2:Y=Y2:C=0:M(1)=0:GOSUR310:IFCTHENONGGOTO460,680 NEXT:NEXT:IFS1(S2THENS1=S2:A=X1:B=Y1:POKE7702,A:POKE7703,B+48 FORC=0TOM(0)-1:BX(XX(C,0),YX(C,0))=1:NEXT:P=-1:L=0:BX(X1,Y1)=0:00T0390 P=-1:L=2:S3=-480:X3=0:Y3=1 470 X3=X3+1: IFX3=9THENX3=1: Y3=Y3+1: IFY3=9THEN510 IFB%(X3, Y3)THEN470 X=X3:Y=Y3:C=0:M(2)=0:GOSUB310:IFCTHEN530 G0T0470 IFS2>S3THENS2=S3 520 FORC=0TOM(1)-1:BX(XX(C,1),YX(C,1))=-1:NEXT:P=1:L=1:BX(X2,Y2)=0:GOTO440 520 FORC=8TOM(1)-1:BX(XX(C,1):YX(C,1):=-1:NEXT:P=1:L=1:BX(X2,Y2)=8:8UT0440
530 S=M(0)+SX(X1,Y1)-M(1)-SX(X2,Y2)+M(2)+SX(X3,Y3)+RND(1):IFS3CSSTHENS3=S
540 FORC=8TOM(2)-1:BX(XX(C,2):YX(C,2))=1:NEXT:BX(X3,Y3)=0:00T0470
550 FORR=1TO8:FORS=1TO8:READSX(R,S):NEXT:NEXT:RETURN
560 BATTA9:1,7.6.6.7.1.9.1.0.2.2.2.2.0.1.7.2.9.3.3.3.2.7.7.6.2.3.3.3.3.2.7.6.5.70
BATTA6.2.3.3.3.3.2.6.7.2.2.3.3.3.2.7.7.1.0.2.2.2.2.0.1.9.1.7.6.6.7.1.9
580 PRINT"[CLR][WHT]WHICH LEVEL:":PRINT"[CUID][CUD][CUD][CVN]1. ADVANCED":PRINT"[CUID]2. AVERAGE":PRINT"[CUID]3. AMATEUR" 590 GETL\$:G=VAL(L\$):IFG<10RG>3THEN590 600 RETURN 670 GOSUB300:PRINT"[CUD] CHICKEN!!":GOTO700 S=M(0)-M(1)+S%(X1,Y1)-S%(X2,Y2)+RND(1):IFS2>STHENS2=S GOT0520 FORR=0T07400:GFTT\$:IFT\$=""THENNEXT





100 REM \*\*\* TASK INTERRUPT FOR EXPANSION \*\*\*

110 REM \*\*\* BY DAVID ROBERTS \*\*\*

120 PRINT"[CLR]":FORK=38400T038443:POKEK,0:NEXT:FORK=7579T07579+21:POKEK,32:NEXT

130 POKE55,191:POKE56,29:X=0:Y=0:A\$=""

140 PRINT"[HOM][CUD][CUD]ENTER MESSAGE.[HOM][CUD][CUD][CUD]END WITH [RVS]RETÜRN[

RV01":PRINT"UP TO 22 CHARACTERS"

150 GETC#: IFC#=""THEN150

160 IFC\$=CHR\$(13)THEN190

170 X=X+1:IFX=10THENX=0:Y=Y+1

180 POKE7721, Y+48: POKE7722, X+48: PRINTC\$; : A\$=A\$+C\$: GOTO150

190 PRINT:IFLEN(A\$)>22THENPRINT"TOO LONG!":FORK=1T0500:NEXT:GOT0120

200 IFLEN(A\$)=0THENPRINT"TOO SHORT!":FORK=1T0500:NEXT:GOT0120

210 FORK=1TOLEN(A\$):B=ASC(MID\$(A\$,K,1)):IFB>63THENB=B-64

220 POKE7657+K, B: NEXTK

230 FORK=1T043:READD:POKE7614+K,D:NEXT:POKE7636+16,LEN(A\$)

240 DATA120,162,213,160,29,204,21;3,208,4,162,191,160,234,142,20,3,140,21,3,88,9

250 DATA162,0,189,234,29,157,0,30,169,0,157,0,150,232,224,22,208,240,76,191,234

260 PRINT"[CLR][CUD][CUD]SYS 7615 TO SWITCH":SYS7615:END

# Enhanced 'Task Interrupt' by David Roberts

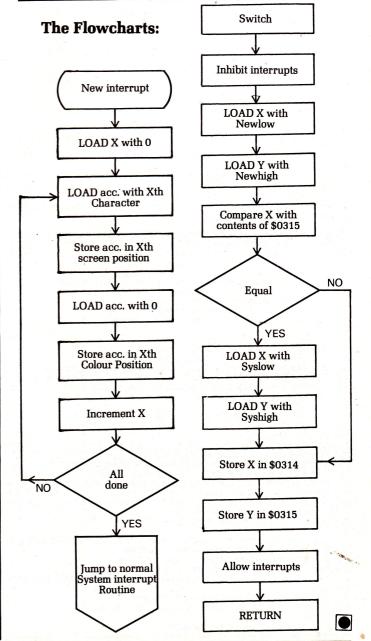
'Victuals' in April 1982 featured a machine-code routine loaded via a Basic program. To unravel the mysteries of R. W. Moore's contribution, ending up with a program that works, follow this design by David Roberts of a slightly refined 'Task Interrupt' routine.

In this version the message is switched on and off with a SYS

7615. The power-up system interrupt address, stored at \$0314/15, is replaced by the address of your new routine.

Careful planning using flowcharts has reduced the machine code to just 65 bytes. Note the use of indexed addressing and both forward and backward branching.

Location	Mnemonic	Hex	Decimal
7615 (\$1DBF)	SEC LDX #Newlow LDY #Newhigh CPY \$0315 BNE Store LDX #Syslow LDY #Syshigh STX \$0314 STY \$0315 CLI RTS	78 A2 D5 A0 1D CC 15 03 D0 04 A2 BF A0 EA 8E 14 03 8E 15 03 58 60	120 162,213 160,29 204,21,3 208,4 162,191 160,234 142,20,3 140,21,3 88 96
7637 (\$1DD5)	LDX #00 LDA Start of Message, X STA Start of Screen, X LDA # 00 STA Start of Colour, X INX CPX no. of characters BNE More JMP System Interrupt	A2 00 BD EA 1D 9D 00 1E A9 00 9D 00 96 E8 E0 16 D0 F0 4C BF EA	157,0,30 169,0 157,0,150 232 224,22 208,240
7658Up to 22 characters of (\$1DEA)	message		
7680 (\$1E00)	Screen		
38400 (\$9600)	Colour		



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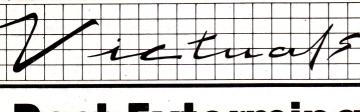
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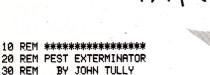
VC8.83



**Pest Exterminator** 

by J A Tully





40 REM \*\*\*\*\*\*\*\*\*\*\*\* 50 GOSUB830 60 LT=100000

20

70 P=7725:C=38445:Q=0:R=8043:S=38763:V=0:Y=87:Z=5:I=5:J=87:G=0:L=81:O=4:A=0:RA=0 :BB=0

80 TI\$="000000"

90 PRINT"[HOM]TIME = SECONDS"

110 K=PEEK(P+Q): IFK=1020RK=230THENQ=0

120 IFFF=1ANDK=160THENQ=0:FF=0

130 IFA=1ANDPEEK(P+1)<>32ANDPEEK(P-1)<>32ANDPEEK(P+22)<>32ANDPEEK(P-22)<>32THEN7

40 140 IFP=7725THENY=PEEK(7726): Z=PEEK(38446)

150 POKEC, Z:POKEP, Y:P=P+Q:C=C+Q:Y=PEEK(P):Z=PEEK(C)

160 IFK=350RK=37THEN740

170 IFK=42THENR=5:G0T0740

180 IFK=LTHEN490

190 POKEC, I: POKEP, J: IFPEEK(P+22)=32ANDA=0THEN470

200 X=0:POKE36876,0:POKE36875,0

210 IFK=224THENQ=0

220 GETA\$: IFA\$="2"THENQ=-1

230 IFA\$="3"THENQ=1 240 IFA\$="+"THENQ=22

IFA\$="-"THENQ=-22 250

260 IFA\$="1"ORA\$="£"THENQ=0

270 IFXX=1THEN700

IFA>1ANDA\$=" "THEN670

290 U=INT(RND(1)\*8):IFU=0THENV=-

300 IFU=1THENV=1

310 IFU=2THENV=-22

320 IFU=3THENV=22

IFAC2THEN380 330

340 IFU=4THENV=-23

350 IFU=5THENV=-21 360 IFU=6THENV=21

370 IFU=7THENY=23

W=PEEK(R+V): IFW=1020RW=42THEN290

390 IFR=1THENPOKER, 230: POKES, 1: GOTO420

400 POKER . 32

410 IFW=660RW=67THEN490

420 R=R+V:S=S+V:POKES,O:POKER,L:IFW=JTHEN490

IFA=@ANDW=229THENAA=1:IFBB=1THENPOKER,32:GOT0740

440 IFA=0ANDW=231THENBB=1:IFAA=1THENPOKER, 32:GOTO740

450 IFA=0THENPOKE36877,200:FORT=0T09:NEXT:POKE36877,0

460 GOTO100

470 IFX=0THENF=220:X=1

480 Q=22:F=F-1:POKE36876,F:POKE36875,F-10:FF=1:GOT0290

490 XX=0: IFW=610RW=15THEN740

500 POKE36875,0:POKE36876,220:FORT=0T0500:NEXT:POKE36876,0:PRINT"[CLR][CUD][CUD]

**Controls** 

move left

move up

move right

move down

fire laser (only

operates in air or space)

CCUDICCUDICCUDICCUDICCUDICCUDI": A=A+1: IFA>1THEN550

510 PRINT"YOU KILLED THE TERMITECCUDICCUDI NOW FOR THE SPIDER":FORT=0T03000:NEX

520 PRINT"[CLR]":POKE36879,136:GOSUB920:FORN=0T09:M=22\*N:POKE38648+N,6:POKE7928+

N, 102 530 POKE38559+M,6:POKE7839+M,102:POKE38570+M,6:POKE7850+M,102:NEXT:J=90:I=2:L=94 :0=0

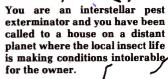
540 P=7725:C=38445:Q=0:G0T090

550 IFA>2THEN590

560 PRINT"THE SPIDER'S SQUASHED![CUD][CUD]WATCH OUT FOR THE WASP":FORT≃0T03000:N

570 PRINT"[CLR]":POKE36879,232:GOSUB920:L=35:0=4:J=61:I=6

580 P=8143:C=38863:Q=0:Y=32:GOTO90



Your first task is to destroy the giant termite which is eating away at the foundations of the house. In your mechanical mole, which can burrow through the ground and fill in behind it so as not to leave a cavity, you must pursue the insect underground and crush it. Of course, your mole cannot burrow through empty space and if you break through into one of the termite's tunnels, you will fall to the bottom and will have to burrow back up through the rock. You must catch the termite before it completes a path from one side the house to the other, or the house will collapse

Having dealt with the termite, you must come to the surface to tackle the superspider which is rapidly filling the house with its umbreakable web. Your method here is simply to race around the house after the spider and when you catch it, tread on it. But don't forget that you can't penetrate the web and if the spider manages to surround you with it, you will be doomed.

After the spider you will need to eliminate the mutant wasp which is making it dangerous to venture into the open since its sting will kill. As you are in the open, you can use your laser gun mounted in your flyer to shoot the wasp from long range but you'll have to be lucky as he dodges about at random and you mustn't let him touch you.

Finally you must take to your space ship and track down the deadly space fiend, for fear of which the merchants in the area have been giving the planet a wide berth of late. Again, you can use your laser cannon but you'll have to get in close to be sure of a hit and if the space fiend touches your ship you will be vaporised. In addition, you have to be careful not to crash into one of the many asteroids which orbit the planet.

If you can succeed in destroying all the pests you will fully deserve the title of Pest Exterminator. But time is money and you must hurry on to your next assignment. Now that you've had some practice, you should be able to do the job quicker next time.





590 IFR=4THFN640 600 PRINT" THE WASP'S DONE FOR. [CUD][CUD]THE SPACE FIEND'S NEXT":FORT≈0TO3000:N EXT:PRINT"[CLR]":POKE36879,8 610 GOSUB920:FORN=0T030 620 D=INT(RND(1)\*394)+7725:IFPEEK(D)<>32THEN620 630 POKED, 42:POKED+30720, INT(RND(1)\*7)+1:NEXT:L=37:0=5:J=15:I=2:GOTO580 IN"; TE; "SECONDS": IFTEKLTT 640 TE=INT(TI/60):PRINT"ALL PESTS EXTERMINATED[CUD] 650 PRINT"[CUD][RED] TIME TO BEAT =";LT:INPUT"[CUD] TRY AGAIN (Y/N)";B\$:IFB\$<> 660 GOSUB900:GOTO70 670 IFQ=0THEN290 680 MP=P+Q:MC=C+Q:XX=1:MQ=Q:IFQ=10RQ=~1THENMS=67 690 IFQ=220RQ=-22THENMS=66 700 MK=PEEK(MP): IFMK=1020RMK=42THENXX=0:GOT0290 710 POKEMC,3:POKEMP,MS:POKE36876,240:FORT=0T05:NEXT:POKE36876,0:IFMK=350RMK=37TH 720 POKEMP,32:MP=MP+MQ:MC=MC+MQ:IFMF=1THENMF=0:GOTO290 730 MF=1:GOTO700 740 FORN=0T015:POKE36878,15-N:POKE36877,200-N:FORM=0T09:POKE36865,35+RND(1)\*9 750 FORT=0T09:NEXTT,M,N:POKE36878,15:POKE36877,0:POKE36876,0:POKE36875,0:POKE368 760 POKE36879,8:PRINT"[CLR][CUD][CUD][CUD][PUR]":XX=0 770 IFA=0THENPRINT"FOUNDATIONS UNDERMINEDICUD][GRN] AND YOUR HOUSE HAS CCUD ICOLLAPSED ON YOU" 780 IFA=1THENPRINT" [CUD][GRN]AND YOU CAN'T ESCAPE" TRAPPED IN THE WEB 790 IFA=2THENPRINT" THE WASP'S STUNG YOU [CUD][GRN]AND THERE ISN'T A CURE" 800 IFA=3THENPRINT" SHIP VAPOURISED BY [CUD]THE DEADLY SPACE FIEND" 810 IFA=5THENPRINT" AFTER ALL THAT YOU":PRINT"[CUD] HIT AN ASTERC HIT AN ASTEROID" 820 FORT=0T03000: NEXT: G0T0650 830 POKE36879, 42: POKE36878, 15: PRINT"[CLR][CUD][CUD][CUD][CUD][YEL] PEST EXTERM BY JOHN TULLY":FORT=0T04000:NEXT 840 PRINT"[CUD][CUD][CUD][CUD][GRN] 850 PRINT"[CLR][CUD][CUD][CUD][CUD][CUD][CUD][CYN] KILL ALL THE PESTS":PRINT"[C UDICCUDI BEFORE THEY KILL YOU":FORT=0T09999:NEXT 860 PRINT"[CLR][YEL][CUD][CUD][CUD] [RVS] CO MOVES LEFT":PRINT"[CUD] 434 MOVES RIGHT" 12 [RVS] CONTROLS [RVO]":PRINT"[CUD] /-/ MOVES UP":PRINT"[CUD] /+/ MOVES DOWN":PRINT"[CUD] 11 870 PRINT"[CUD] ' OR '£' TO STOP" [RVS]SPACE[RVO] TO FIRE":PRINT"[CUD] (ONLY OPERATES" 880 PRINT"[CUD][CUD] IN AIR OR SPACE)" 890 FORT=0T015000:NEXT 900 PRINT"[CLR][RED]":FORN=0T017:FORM=0T019:POKE38446+N+22\*M,2:POKE7726+N+22\*M,1 910 POKE38445+22\*M, 2: POKE7725+22\*M, 229: POKE38464+22\*M, 2: POKE7744+22\*M, 231: NEXTM, 920 FORN=0T020:POKE38422+N,6:POKE7702+N,102:POKE3885+N,6:POKE8165+N,102 930 M=22\*N:POKE38444+M,6:POKE7724+M,102:POKE38443+M,6:POKE7723+M,102:NEXT:RETURN

100 REM \*\*\* 3D UFO WITHOUT HIDDEN LINES \*\*\* ◀

110 REM \*\*\* BY LEONARD MORROW \*\*\*

120 GRAPHIC 2: COLOR 0,0,5,0

130 A=512: B=A\*A: C=512

140 FOR X=O TO A STEP 6

150 S=X\*X: P=SQR(B-S): I=-P

160 FOR DO=1 TO 10000

170 R=SQR(S+I\*I)/A

180 Q=(R-1)\*SIN(24\*R)

190 Y=I/3+9\*C

200 IF I=-P THEN M=Y: GOTO 230

210 IF YOM THEN M=Y: GOTO 240

220 IF YON THEN 260

230 N=Y

240 Y=C+Y

250 POINT 2,A-X,Y: POINT 2,A+X,Y

260 I=I+4: IF IDP THEN 280

270 NEXT DO

280 NEXT X

290 END

### 3D UFO

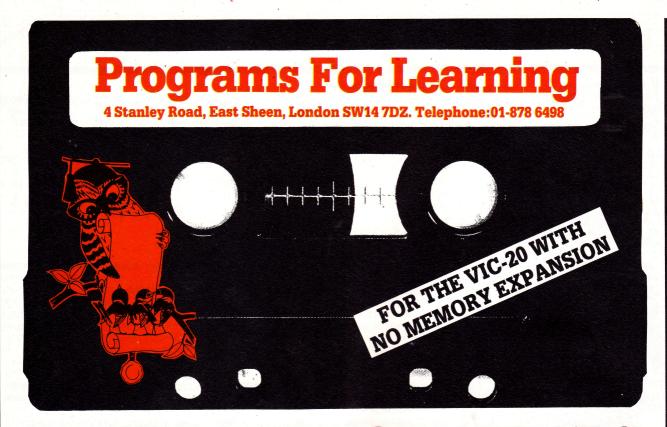
### by Leonard Morrow

People who make a living designing fancy CAD system for architects and designers spend a lot of time on the problems of perspective and removing 'hidden' lines — it's easy enough to draw the shape, it's harder to decide, which of its lines wouldn't be seen in practice if it was 'real'. Leonard's Super Expander routine does just that.

It draws a flying saucer in 3D with all the hidden lines removed. It's not very long — at least, it's a short program: but it does take about half an hour to run! The end result is fascinating, though, and there's lots of scope for enhancement: some colour would be nice (it's black and white as it stands) and maybe a moving background of some kind (using the kind of tricks in Josh's Rai's little 'Seagull' Victual, perhaps?

The program is a straight conversion by Leonard of something he found in an Acorn manual, so he makes no claims for its originality.





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### **Polygons** by J P Mensinck

### This little Super Expander routine from Mr Mensinck draws quite effective polygons. Could be useful.

It's obviously adaptable. As it stands, line 50 gives the centre of the polygon (variables M,N), its size (C), and the number of sides (R). Lines 180-170 draw the figures You could do some painting before line 180 (shift 190 beyond the SCNCLR if you're doing that).

You want diagonals? Replace line 140 with...

### 140 IF X>Y THEN 54

For polygons with radii replace 140 and add a new line:

140 IF X > Y OR XX - Y = 1 OR X - Y = R - 1 THEN 54165 DRAW 2,M,N, TO P(X),Q(X)

- 10 REM \*\*\* POLYGONS \*\*\*
- 20 REM \*\*\* BY J P MENSINCK \*\*\*
- 30 GRAPHIC 2
- 40 COLOR 1,5,0,10
- 50 M=512: N=512: C=350: D=C\*7/10
- 60 R=3
- 70 FOR T=1 TO R
- 80 S=T\*4\*π/(R\*2)
- 90 V=COS(S): U=SIN(S)
- 100 P=C\*V: Q=D\*U
- 110 P(T)=INT(M+P): Q(T)=INT(N+Q)
- 120 NEXT T
- 130 FOP X=1 TO R: FOR Y=1 TO R
- 140 IF X-Y=1 OR X-Y=R-1 THEN 160
- 150 GOTO 170
- 160 DRAW 2, P(X),Q(X)TO P(Y),Q(Y)
- 170 NEXT Y: NEXT X
- 180 FOR W=1 TO 1000: NEXT
- 190 R=R+1
- 200 SCNCLR
- 210 IF R=10 THEN END
- 220 GOTO 70



- 10 PRINTCHR\$(8)
- 20 DI(1)=128
- 30 FORT=2T08:DI(T)=DI(T-1)/2:NEXT
- 40 R=4
- 50 FORT=7168T07679:POKET, PEEK(T+25600):NEXT
- FORT=7184T07231
- 70 READD: POKET, D: NEXT
- 80 PRINT"[CUD][CUD][BLU] PRESS - A KEY"
- 90 PRINT"[GRN]"
- 100 GETA\$: IFA\$=""THEN100
- 110 TI\$="000000"
- 120 PRINT"[CLR]";
- 130 FORT=0T0506:POKE7680+T,1:POKE38400+T,2:NEXT
- 140 PRINT"[HOM]"
- 150 PRINTTAB(9)"[CUD][CUD][CUD][CUD]BC[CUD][CUL][CUL]DE[CUD][CUL][CUL]FG"
- 160 POKE36869,255
- 170 POKE37879,255
- 180 FORT=7176T07183:POKET.0:NEXT
- 190 FORT=7176T07183
- 200 POKET, DI(R)
- 210 IFT=7176THENPOKE7183.0
- 220 IFT>7176THENPOKET-1,0
- 230 IFR=8THENGOSUB350:G0T0280
- 240 IFR=1THENGOSUB390:G0T0280 250 E=INT(RND(1)\*2)
- 260 IFE=0THENR=R-1:G0T0280
- 270 R=R+1
- 280 POKE7185,7:POKE7193,224:POKE7185,0:POKE7193,0 **290 NEXT**
- 300 IFTI\$>"000015"THENP0=T:GOTO430
- 310 GOTO190
- 320 DATA0,7,1,3,7,31,63,127,0,224,128,192,224,248,252,254,255
- 330 DATA231,7,3,3,3,3,6,255,231,224,192,192,192,192,96,14,0,0,0,0,0,0,0,0,112,0,0,
- 0,0,0
- 340 DATA0, 0, 20, 62, 62, 124, 94, 63, 54, 16
- 350 E=INT(RND(1)\*2)
- 360 IFE=1THENR=R-1:G0T0380
- 370 E=1
- 380 RETURN
- 390 E=INT(RND(1)\*2)
- 400 IFE=QTHENR=8:GOTO420
- 410 E=E+1
- 420 RETURN
- 430 FORT=7232T07239:READQ:POKET,Q:NEXT
- 450 FORX=1T04
- 460 PRINTTAB(10)"[RED][CUP]A[CUD][CUL][BLK]H"
- 465 FORU=1T050:NEXT
- 470 NEXT
- 480 POKE36877,145
- 490 FORT=15T01STEP-1
- 500 POKE36878, T
- 510 FORI=1T0800/T:NEXT:NEXT
- 520 POKE36877,0
- 530 PRINT"[CLR]"; : POKE36869,240: POKE37879,62 ~~

## Seagull

### by Josh Rai

Another US contribution from Josh Rai of Great Neck, New

He writes: "I just began to really get into Vic graphics, and I figured out hi-res movement for myself - so don't try to compare these programs with Jim Butterfield's". Seagull he actually named 'Airplane', but we thought the shape looked more like a bird; the program doesn't do very much, but the denouement had us laughing out loud (very sick sense of humour we've got) - and it is a very nice demo of moving graphics, the kind of thing you could well incorporate into your own work.

# **Graph**by Finnur Larusson

You want international, you got international: this one comes from Iceland, whence Finnur offers yet another graph-drawer for the Super Expander.

In both the March and the June issues of our wonderful magazine we publish programs that plot graphs of functions. In Finnur's opinion, both are "totally inadequate" for the purpose: they are restricted to a coordinate system that cannot easily be adjusted to the function in question (scale of the y-axis).

When he bought his Super Expander some months ago, he wrote a program that overcomes such limitations. It first asks for the lower and upper limits of the interval, that is the range of the x-axis. Then it divides this interval into 160 parts (corresponding to the resolution of the screen) and calculates for each of these 160 values the corresponding function value. The function, by the way, is defined in line 10.

Then the program decides the range of the y-axis so that the maximum and minimum points of the interval are plotted respectively on the upper and the lower edge of the screen.

After that the program goes back to the beginning, when the user has pressed any key, and asks for the limits of a new interval.

This is very convenient when you want to solve complex equations of the form f(x)=0 by means of iteration: enclose the intersection of the graph with the x-axis in a smaller and smaller interval until a desired degree of accuracy is obtained.

```
REM **** GRAPH ****
                                   FINNUR LARUSSON **************
         B Y FIN
10 DEFFNA(X)=SIN(X)
20 INPUT"[CLR]LOWER LIMIT";N
30 INPUT"UPPER LIMIT";N
40 DIMA(159)
50 GRAPHIC2
   COLORD.6.1,8:H=FNA(N):L=FNA(N)
FORI=NTOE+1E-7 STEP(E-N)/159
A(C)=FNA(I):C=C+1
90 IFFNA(I)>HTHENH=FNA(I)
100 IFFNA(I)<LTHENL=FNA(I)
120 A=0:R=INT((H-A(0))/(H-L)*1023+,5)
130 FORI=1T0159
    X=INT(I*1023/159+.5):Y=INT((H-A(I))/(H-L)*1023+.5)
150 DRAW2, A, BTOX, Y
160 A=X:B=Y
170 NEXTI
    IFECOORNOOTHEN200
190 DRAWS, INT(-N/(E-N)*1023+.5),0TOINT(-N/(E-N)*1023+.5),1023
    IFH<00RL>0THEN220
210 DRAN2.0, INT(H/(H-L)*1023+.5)T01023, INT(H/(H-L)*1023+.5)
220 GET#$: IFA$=""THEN220
```

```
1 REM *** SPRITE EDITOR ***
2 REM *** BY IAIN ROBERTSON ***
1000 SR=53248:SC=53281:SB=SC-1:CR=160:DIMSPX(62):XX=1
        1902 PRINT"[CLR][CVN][CUD][CUD][CUD][CUD][CUD][CUR][CUR][CUR][CUR][CUR][CUR][CUR]
        1003 PRINT"[CUR][CUR][CUR][CUR][CUR]
1004 PRINT"[CUR][CUR][CUR][CUR][CUR]
                                                               [RVS]COMMODORE 64[RV0]
        1005 PRINT"COURTICURTICURTICURTICURTICURT
1006 PRINT" * [RVSTIAIN ROBERTSON[RVO]
1007 PRINT" [CURTICURTICURTICURTICURTICURT]
        1008 PRINT"
                                                                  TRVS18GE 16TRV01
        1998 PRINT" [CUR][CUR][CUR][CUR][CUR][CUR]
1999 PRINT"[CUR][CUR][CUR][CUR][CUR]
        1010 PRINT"[CUR][CUR][CUR][CUR][CUR]
1011 PRINT"[CUR][CUR][CUR][CUR][CUR]
                                                                 FRVS1(C) 1983FRV01
        1012 PRINT"[CUR][CUR][CUR][CUR][CUR][CUR]
                                                           NEXT: POKE198, 0
        1013 IFXX=0THENPOKESC,0:POKESB,0:END
        1015 GOSUB1202:POKE198,0:GOSUB1190:POKE650,222:XX=NOT1
1020 PRINT"[CLR][RVS] PLEASE WAIT. DRAWING GRAPH
        1027 REM
        1028 REM ******
                              GRID ********
        1030 FORY=0T020:POKE1150+40*Y,102:FORX=0T023
        1040 POKE1151+40*Y+X,46:NEXT:POKE1151+40*Y+X,102:NEXT:POKESC,8
        1042 PRINT"[RVS][CUP]SERIES |
                                                1,2
        1043 PRINT"[RVS][CUP]
        1050 Z=0:FORY=0T020:FORS=0T02:BI=0:FORX=7T00STEP-1
        1054 XY=1151+40*Y+S*8+7-X
1055 POKEXY,90:REM****** 90 = CURSOR
                                                          Sprite Editor
             A=PEEK(197):REM** KEY CHECK
        1060 IFA=1THENPOKEXY,160:GOTO1085
        1063 POKEXY, 32
                                                          by Iain Robertson
        1065 IFA=60THENPOKEXY,32:GOTO1090
1070 IFA<7ANDA>2ANDXY=1151THEN1055
        1072 [FAC7ANDRD2ANDX=7THENS=S-1:2=Z-1:BI=0:GOT01073
1073 [FAC7ANDRD2THENX=7:BI=0:Z=Z
             IFAC7ANDA>2ANDSCOTHENY=Y-1:S=2
        1075 IFAC7ANDA>2THENPOKE198,0:FORT=1T08E1:NEXT:POKE198,0
        1080 GOTO1054
        1085 BI=BI+(21X)
        1090 POKE198,0:FORT=1T075:NEXTT,X:SP%(Z)=BI:Z=Z+1:NEXTS,Y
        1100 PRINT"[CLR][RVS] SPRIT
1110 FORT=0TO62:PRINTSP%(T);:NEXT:PRINT
                                              SPRITE DATA
        ][CUD][CUD][CUD][CUD][CUD][CUR][CUR][CUR][CUR][CUD]PRESS A KEY TO SEE SPRITE":GE
        1112 IFA$=""THEN1111
        1113 REM
                  ***** MOVE SPRITE *****
        1115 REM
        1120 POKESR+21;4:POKE2042;14:FORT=0TO62:POKE896+T,SPX(T):NEXT
1130 FORT=1T0150:POKESR+4,T:POKESR+5,T:NEXT:FORT=0TO2E3:NEXT:POKESR+21;0
1140 PRINT"[CLR][CUD][CUD][CUD] DO YOU WISH TO SAVE DATA ON TAPE (Y/N)?"
        1141 GETA$: IFA$="Y"THEN1170
        1142 IFA$<>"N"THEN1141
        1144 REM ***** START AGAIN OR END ****
XD
        1150 PRINT"[CLR][CUD][CUD] DO YOU WISH TO SEE DATA AGAIN OR RETURN TO START[CUD]
        (RVS)COUR)COUR)COUR)COUR)COUR) PRESS "
1151 PRINT"COUR) (RVS) D-SEE DATA COUR)COUR)COUR)COUR)COUR) R-RETURN START COUR)
        IT PROGRAM "
        1152 IFA$="D"THEN1100
        1153 GETA$: IFA$="D"THEN1100
1154 IFA$="*"THENXX=0
        1155 IFA$<>"R"ANDA$<>"*"THEN1153
        1156 POKESC, 9: 80T01002
1167 REM
        1168 REM ****** DATA SAVE *****
        1169 REM
         1188 REM ****** DATA LOAD *****
        1190 POKESC,9:POKESB,2:PRINT"[CLR][RVS]
                                                                   DATA LOAD
        1191 PRINT"CHOMICCUDICCUDICCUDI DO YOU WISH TO LOAD A SPRITE OFF TAPECCUDI
                       (YZN)"
        1192 GETA$: IFA$="N"THENRETURN
        1193 IFA$<>"Y"THEN1192
        1194 PRINT"[CUD][CUD]NAME OF SPRITE ":INPUTSP$:INPUT"[CUD][CUD]FILE NO. ";FL:P
        OKE198,0
        1195 OPENFL,1.0,SP$:PRINT"[CLR][RVS][CUR][CUR][CUR][CUR]FILE";FL;"[CUL] ";SP$;"
        1196 FORT=1T02E3:NEXT:PRINT"[CUD]"
        1130 FORT-0102E3:NEXT:FRINT:LOUDJ"
1137 FORT-01062:INPUT# FL.SPX(T):PRINTSPX(T):NEXT:CLOSE FL:PRINT"[CUDJ"
1198 PRINT:PRINT"[RVS][CUR][CUR][CUR][CUR][CUR][CUR][CUR] FILE";FL;"[CUL] ";SP$;
" CLOSED ":FORT-1104E3:NEXT:GOT01100
1199 REM
         1200 REM ****** INSTRUCTIONS *****
        1201 REM
```

GRAPHICO: RUN

We wanted our first Commodore 64 program to be something really useful, and quite by chance this one arrived from Inverness at the right time. Iain fell in love with the sprites on his 64 — "they were so easy to use and to control, each one was a piece of cake" — but he got through reams of paper designing them. So he wrote a program to do it for himself.

It puts a big 24x21 grid of marked pixel positions on to the screen. The cursor moves left to right (a useful mod would be to permit up and down movement as well, or even a direct GOTO command of some kind to get you to a specific pixel position in the grid). Use the space bar to leave a pixel blank, fill it by keying RETURN.

When you get to the end of the grid the program reads what you've done and lets you save the 63 pieces of data on tape. The sprite can then be loaded into a program (with a merge, or by copying the data by hand). Or it can be brought back on to the screen with the Editor for modification — in fact, as it stands that's the only way you can edit any mistakes. At least you no longer have to redesign a sprite every time you want to use one.

":F0

INSTRUCTIONS ?

RT=1T01.3E3:NEXT 1204 GETA\$:IFA\$="N"THENPOKE198.0:RETURN

1203 PRINT"[HOM][CUD][CUD][CUD][RVS]

1205 IFA\*C>"Y"THENPRINT"[CLR]":FORT=1T05E2:NEXT:GOT01203 1206 PRINT"[RVS][CLR] SPRITE GRAPHICS

1207 PRINT"[CUD][CUD][CUR][CUR][CUR] THIS PROGRAM ALLOWS YOU TO DRAW A

1208 PRINT" ON THE GRID IS A CURSOR ( ) THIS IS CONTROLLED
1208 PRINT" ON THE GRID IS A CURSOR ( ) THIS IS CONTROLLED
1209 PRINT"[CUD][CUD] [RVS]/RETURN/[RVO] - TO FILL A PIXEL"
1210 PRINT"[CUD] [RVS]/SPACE/(RVO] - TO INSERT A SPACE" CONTROLLED BY USING THE KEYS

1211 PRINT"[CUD] ONCE THE GRID IS FULL THE COMPUTER TA." WORKS OUT THE SPRITE DA

1212 PRINT" DISPLAYING IT ON THE SCREEN ."

1213 PRINTS\$; "+"

CURSOR CONTROL 1216 PRINT"[CLR][PUR][RVS]

1217 PRINT"(CUDDICUDICUDICUDICUDI) USING ANY (RVS)(GRN)FUNCTION KEY(RVO)(PUR)
THE CURSOR CAN BE MOVED BACK IN "
1218 PRINT" BLOCKS OF (RVS)(GPN)9(RVO)(PUR) GRID SQUARES TO CORRECT ANY MISTAKES

1219 GETA#: IFA#O""THENRETURN

RVSJEGRNJ PRESS ANY KEY TO START ": GOTO1219

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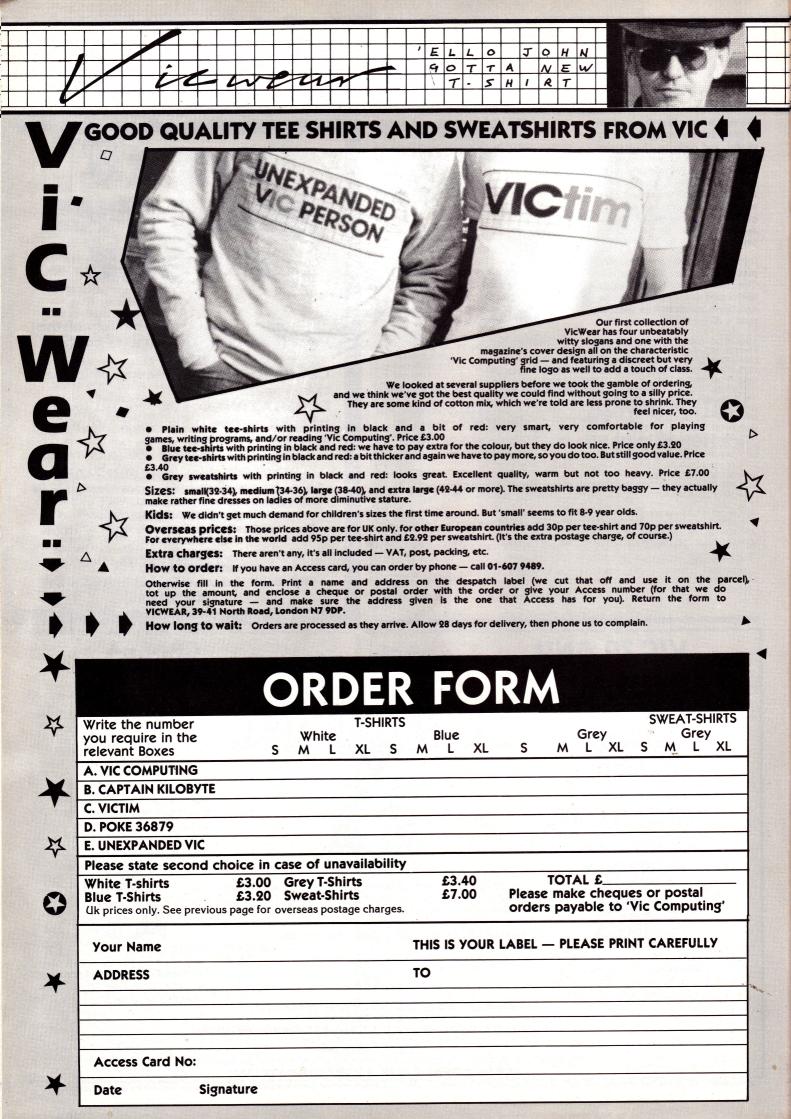
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Tommy is our resident technical expert. All the technical queries we get on the Vic are passed straight on to him, and nearly all of them will get a reply — usually in this column of the magazine rather than a personal missive, though you might just be lucky.

Every day almost, letters arrive asking how to downgrade expanded Vics, say to run a program written for a Vic + 3K on a Vic fitted with a 8K expansion — in spite of the fact that we have published this information several times in previous issues!

So for the last time, you have to run the following program:

### 10 POKE 642,X: POKE 644,Y 20 POKE 648,Z: SYS 64824

...where the values of X, Y and Z are taken from the following table:

	X	Y	Z
unexpanded	16	30	30
+ 3K	4	30	30
+ 8K	18	64	16
+ 16K	18	96	16
+ 24K	18	128	16

The change will hold until you next turn the Vic off, so you can load and run as many programs as you like which use the new format.

### I have also had queries on how to disconnect the Super Expander cartridge without unplugging it.

It is obviously preferable to do this by means of software, because continually removing and replacing cartridges will quickly wear away the gold contacts and make the things unreliable. If you have a Super Expander fitted, you should add this to the program:

#### 30 SYS 64850: REM DIS-CONNECTS EXPANDER AFTER DOWNGRADE

...or this:

#### 30 SYS 41031: REM RE-CONNECTS EXPANDER AFTER DOWNGRADE

On the same subject, I had a panic-stricken letter from a Mr. H. Nutter whose young son typed these instructions into his 2001 model Pet. "I am left with 1025 BYTES FREE on turn on", he says. The good news, Mr. Nutter, is that the instructions your son typed in

### **Instant Answers**

have absolutely nothing to do with your problems: that area is one of the Pet's cassette buffers, and in any case the effect of the POKEs disappears when the machine is turned off. The problem is in fact a hardware fault, so you will have to take the machine to a computer dealer who can replace the faulty memory chip for you.

A large part of my postbag every week consist of letters from people suffering from OUT OF MEMORY errors of the second sort: that is those caused by too many FOR loops or GOSUBs.

You can recognise this problem because if you give a PRINT FRE (0) command to find out the amount of memory, you will find that there is in fact plenty of room left! What is happening is that one of the special areas of the Vic's memory called the stack has become full. This is used by Basic to store information about active FOR loops and subroutines: and when it is full you get the OUT OF MEMORY error.

The problem is that the line number where the error occurs bears absolutely no relation to where the error actually is! This is because the faulty line (wherever it is) has almost but not quite exhausted the stack space. So it's another, perfectly correct, line which gets the blame.

Although it is possible to use up the stack space by having two many FOR loops in a program, to get the error you need to have quite a few of them with different FOR variables active at once (either because they are nested, or because you are jumping out of the loop before it has finished — a very dangerous thing to do. Most programmers only use two or three variables for controlled loops, because it is very rare to need more than two or three levels of nesting).

By far the most likely cause of the problem is another bad programming trick — leaving a subroutine by means of a GOTO rather than a RETURN.

When Basic comes to a GOSUB statement it stores the position of the next statement in the program on the stack (the statement which the RETURN statement will go to). If you now leave the subroutine by a GOTO so that the main program comes back to the same GOSUB statement again, the same inform-

ation is put onto the stack again (unlike a FOR loop: if Basic comes to a 'FOR I' statement and there is already an 'I' loop active, then it clears off the existing 'I' loop and any other loops inside it before opening the new 'I' loop).

When this happens the stack space is very quickly used up. As I explained above, however the line number where the OUT OF MEMORY error occurs bears no relation to where the errant GOTO is. All you can do is to put nose to grindstone and search all your subroutines for the faulty one.

Dear Tommy, What do I need to program into the computer to allow me to disable the normal keyboard and use only certain keys?

To do this in a complete way so that keys are ignored by the INPUT statement means rewriting a large part of the Vic's operating system! Fortunately there is an easier way via Basic's GET statement.

The GET statement accepts a single key from the keyboard and puts it into a string variable. For example, the following program waits for a key to be pressed and then displays it on the screen:

### 100 GET A\$: IF A\$ = "" THEN 100 110 PRINT A\$

Having accepted a key from the keyboard, you can now test if you want it. We can modify the program to only accept the digits 0 to 9:

100 GET A\$ : IF A\$ = ""
THEN 100
110 IF A\$ < "1" OR A\$ > "9"
THEN 100
120 PRINT A\$

As you may know, every memory location in the VIC is one byte (or eight bits) wide; they can also be divided into two groups of four bits (called 'nibbles' for obvious reasons). Now only the bottom nibble is used to decide the actual character colour, so you need to make sure that you only look at these four bits when checking the colour. Line 210 should become:

#### 20 FOR A = 0 TO 50: PRINT PEEK (38400 + A) AND 15:: NEXT

The AND 15 means that the value printed is that of the lower order nibble, the top one being ignored.

Dear Tommy, The last time I unplugged the aerial lead from

the Vic it was very hard to remove, and when I reconnected it there was no response on the screen. I am left with the feeling that I may have damaged the socket or the connection.

Please tell me if there is anything I can do. Or should I return the computer and socket to the retailer for repair?

It does sound as though it is a job for your friendly dealer to sort out (at vast expense no doubt!) But in my experience if you have a guilty conscience about something, it is very easy to talk yourself into believing that the thing is faulty when in fact the problem is staring you in the face. Check all the leads and connections between the Vic and the TV, and then check that the TV is still tuned to the correct channel. Maybe somebody has been playing with the set while you were out?

Mr. S.J.P. Feron, amongst others, has written complaining of a bug in the Vic.

He asked the Vic:

PRINT 40\*1.81 + 41.27 - 109.16

The Vic replied 4.51000004, instead of 4.51! What went wrong? Well the Vic (in common with any other computer) only has limited accuracy — in the Vic's case, seven significant digits.

I am sure you are familiar with the problem of expressing pi in decimal form — they go on for ever. Similar things happen whenever you use floating point variables in a program; the worst problems occur when you try to subtract two numbers (such as 1000 - 1000.01).

Another common problem is comparing two variables. You may print the values of A and B, and they look the same; but an IF statement like IF A = B THEN is never executed!

The way around this problem is not to use IF A=B (which you should never do anyway), but instead to work out how close the limits are — so that if A and B differ by less than one millionth, they can be considered identical: IF ABS(A+B) > 10 E-6 THEN...

The problem of numerical accuracy is a very complicated one and can only be avoided completely by using fixed-point arithmetic, which is very slow (although there are techniques to minimise these errors). Most programs will never cause any problems; but if you are writing complicated scientific or engineering calculations you should be aware of the problems and get some good books on the subject!

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#### Dear Vic,

Here is a way of printing at certain positions on the screen without having to use long strings of cursor controls.

To change the position of the cursor you must change locations 209 and 210. These two bytes store the screen address of the cursor: byte 209 stores the units from 0 to 255, byte 210 stores sets of 256 (if 210 stores 2 then this represents 2x256).

If PEEK 210 equals 30 and PEEK 209 equals 0, then the cursor is at memory location 7680 — 30x256 plus 0 which equals 7680. So to print "VIC-20" with the V at location 7933, enter this line and press return:

POKE 210,30; POKE 209,253: PRINT "VIC-20"

Location 7933 is made up by 30x256 plus 253.

A.M. Bancroft, 10, Moat Bank, Buron-on-Trent, Staffs DE15 0QJ.

#### Dear Vic,

First of all I would like to congratulate Vic Computing for maintaining its excellent quality magazine in the June issue.

I was glad to see a games review issue but I was disappointed by the way it was set up. Since you reviewed so many games, the detail in their descriptions was poor. Many of the games reviewed didn't reveal much more information than the advertisers do in their advertisements.

I would suggest that Vic Computing set aside a few pages each issue for 'software reviews' which would have less games than in the June edition but described with more detail and accuracy, and could also review education, business and utility software too.

Also, instead of grading the games by overall opinion more detailed qualities could be graded, such as originality, graphics, addictiveness, presentation, increasing difficulty, smooth movement, colour and sound (for a black and white TV also) etc. What the game's like, how many stages, hires or low-res, what the theme of the game is like — all helpful to tell to the person who's not sure exactly what's the right game for himself/herself is.

I own a 16K RAM pack and have used it a lot. Some software companies take advantage of the number of people that have 8K or 16K by making superb programs using the extra memory. I wish Victuals would take advantage also and occasionally offer some 'better' programs that require extra memory. After all, you do occasionally print programs that require the super expander (once in an edition, only Super Expander programs were in Victuals!) and there must be as many people with

8K or 16K as there are who own the super expander. Don't forget us who have extra memory!

In many of your articles you tend to forget to make known to us how programs can run using 8K or 16K. The article on user-defined graphics is a good example (from the December edition). The article was super — if you didn't need to use the user-defined graphics in a program where you needed extra memory. Not once in that article did it mention the new locations etc. if 8K or 16K was used.

David Jones, 43 rue de la Terassière, 1207, Genève, Switzerland

We take the point about more detailed program reviews in preference to so many brief ones, but in general we feel that with games at least the problem is one of quantity - and if we were to look in depth at just three or four we'd be doing readers a disservice by not at least indicating how good all the others are. We do run longer reviews on Vic software when there aren't so many options competing for the attention — and when the packages are sufficiently complex to warrant the lengthier approach.

Still, we are trying for a more sytematic style of short review using headings like those you suggested.

As for 'Victuals' of greater complexity, we can only print what's submitted: and so far all the better submissions have been for unexpanded Vic or the Super Expander.

You've probably seen Mike Todd's piece on memory in the June issue by now; that should help with reconfiguring for expanded memory. Kevin Smart, who writes the Graphics series, has been asked to cover expansion as well.

### Dear Vic,

May I thank you for the excellent review in your magazine on the Hales Speech Synthesiser. However I am a bit concerned as the product is not being marketed by Hales. Whilst I appreciate that you probably had a press release to this effect, a change to the marketing policy took place before Hales actively started to sell the range of products manufactured by ourselves.

To bring you completely up to date, Adman Electronics Limited manufactures and markets this range which is available from Spectrum Computer Stores, Dixons Photographics, and many other good computer stores.

With regard to the article, I would like to point out the following:

 Instruction manual re-written
 Includes instruction for R.F. lead connection

- Other errors in manual, i.e. program details, have been corrected
- Care has been taken to ensure that a newcomer to computing understands the manual
- Notes have been included in the manual for people with disk drives
- 5. Regarding Super Expander, unfortunately there is no way that it can be used with our Speech Synthesiser as they have the same memory address location and it is not possible to change either

 Allophone pronunciation: a number of improvements have been made in this area to give better clarity

8. The price is £49.95 including VAT.

M. Shorrock, Sales Manager, Adman Electronics Ltd.

#### Dear Vic,

Having just bought a Vic disk drive, I read Mike Grace's article with considerable fellow feeling. Not even having experienced floppies before, I started even further behind than Mike: in fact I spent a considerable time searching for the disk drive "door", expecting to find something which opened and closed.

I had asked the dealer if I needed to buy a disk, but he said no, the test/demo disk would suffice. However, having eventually discovered that the "door" was in fact a slot, I read on to LOAD "PERFORMANCE TEST", 8, and read that the screen would then display "insert scratch diskette in drive" - no instruction to take out the test disk first. In any case I had been told no other disk was required. Anyway what was a 'scratch'' disk? Later we read that we should be very careful not to scratch a disk surface. .

Proceeding now to "initialization". This first states that whenever a disk is inserted it must be initialized, then later says "operator initialization is not required if unique ID's are assigned to each disk". What are unique IDs?

However, a further visit to the dealer cleared up these points and I must agree with Mike's final paragraph that a disk drive is a worthwhile purchase. But there is still a lot I have to learn.

J. Sheard, 28, Grindsbrook Road, Radcliffe, Manchester M26 0JS.

#### Dear Vic,

I have just received the first copy of your new magazine with my copy of Vic Computing. On the whole it appears to be an excellent magazine, but I must protest about the machine code routine to print the 255 ASCII characters on the Vic-20.

This routine is actually self-modifying because it stores the 'CHAR' value in the middle of the code. While working, the address of this value has been modified to point into zero page (into the data line vector). To get round this the start of the routine should be relocated to 833 (\$0340) which is where Nick Hampshire's original routine started.

Altenatively the following routine is shorter, faster and requires no storage location:

828 LDX #\$00

830 TXA

831 STA \$1E00,X

834 LDA #\$02

836 STA \$9600,X

839 INX

840 BNE \$F4

842 RTS

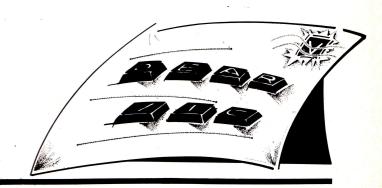
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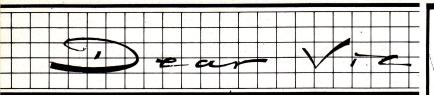
#### Dear Vic.

I am one of your many Western Australian readers. Each issue is read and some of the British stuff advertised is very tempting.

Unfortunately a lot of it is ungetable. I have written to a couple of your advertisers, only to be told that they can't supply me direct because they have agencies in Australia.

I first hit this snag with Sinclair. I wanted to update my ZX80, imported from Britain incidentally, to a Spectrum. They won't supply because of the agent. The ZX81 was way overpriced (\$250) in Australia, and the Spectrum has only just become avail-





able. So last year, sod them, I bought a Vic-20.

Now I find the 40/80 Column unit at £99.95 in Britain is \$259 here. Quite a difference. I was one of the lucky ones to get a Softex interface direct and it works superbly; but I wrote for a Basic Compiler (no joy, because of an Australian agent) and two word processor people (and so far I have had no reply).

Lastly the problem with prices. As a magazine that is available outside Britain, ex VAT prices and postage ought to be quoted on all adverts. I would also like to get hold of a set of Vic Revealed errata; but I can't send a stamped addressed envelope, and I don't know how much to send.

Enough complaints: the mag is always looked forward to. There is a large active "Vic-Ups" club here in Perth, over 120 members, and we do what we can with what we have. Me, I'd like a few more Super Expander programs, but I can wait

#### Eddie Mills, 45 Zamia Place, Greenwood, 6024 Western Australia.

It's a tough life in the colonial outposts... Many suppliers will sell overseas if they accept credit cards; you can quote your card number in an ordering letter. But you might have to grin and bear it when you see how much they added for carriage.

We're not sure if TOTL.TEXT is still available outside the States. As for RABBIT WRITER, we did request a review copy but heard no more.

#### Dear Vic.

Do you ever get the idea that machines really do know better than you? I do with this Vic I've got!! I bought the machine just over 12 months ago: then a month after, bought an Arfon 16K RAM pack for it. After waiting a suitable period (nine months sounds too obvious) I decided on the Seikosha GP100VC Printer, for the following reasons:

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Adapter (from Sumlock of Manchester) to use standard A4 paper and my own letterheadings

To be honest, looks a more professional machine than the genuine Vic Printer

Tandy sells self-adhesive labels to fit (part No. 72-017)

I have since purchased the Vicwriter, Simplicalc and Stock Control programs. I used Vicwriter and Simplicalc more than the Stock Control, but I am disappointed that there's no facility on the Vicwriter program to use the

double-width characters. I was naturally very interested in your review of this program in the February issue and take your points on the different systems available: but as a newcomer to computers I liked Vicwriter because I didn't know anything different.

Now I come to my point about machines knowing better. Because I don't have genuine Commodore equipment I think it's getting back at me! Everytime I use Vicwriter when I've written a letter, I have to save it on tape, clear the memory then re-load the letter before the printer will print it out. Unless I do this, when I press P 10 to print NOTHING HAPPENS! The only way of escaping is to switch the printer off and on.

At least when I start copying programs from your magazine there's a better chance that they'll work instead of some other magazines I've tried.

A few other points that occur to me: I run a small business selling tools and equipment to garages and so bought the Commodore Stock Control program, but find it's no use to me as all my stock is numbered alphanumerically — KC515, R1618, SSDM40A etc — and the program won't accept this unless you use it as the description. So I'll continue using my old system until I'm allowed to buy a disk drive!

Once again, congratulations on an excellent magazine, the silly comments in the December issue really endeared you to me.

John Dunstan, 58 Ashtree Road, Barton-Under-Needwood, Staffs. DE13 8LJ.

#### Dear Vic.

I should first of all like to say how much I enjoy your magazine being a newcomer to the computer world. Your articles are clear and make life much easier in the complex world of SYNTAX ERRORS and OUT OF MEMORY messages.

Having now ensured that you may perhaps read a little further may I relate my recent experience in trying to upgrade my Vic-20 for its big brother the 64. Encouraged by your December 1982 issue's interview with Commodore's Mr. J. Baxter, I visited a local Commodore dealer's shop and timidly asked what part-exchange deal they could do on my Vic and assorted Commodore software against a 64. My word, they were taken much aback!! Commodore were now selling for £139 what I had paid but a few months ago £250 for: how could they offer me any reasonable figure for my machine.

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Now, I know that Commodore do not need to make any attractive offer. The machine was sold and I bought in good faith at the figure prevailing at that time. I can also appreciate that market demands are such that the Vic was becoming overpriced. But I venture to add that if the interview carried in that issue was a true record of what was said, what has happened in the meantime to change their opinion?

I wrote to Mr. Baxter a little over two weeks ago. To date I have not had the courtesy of a reply, not even an acknowledgement. At the very least, he could hve told me where to go! This in spite of the fact that Commodore themselves had caused a depreciation in value of my Vic to the order of 44.4%.

Enough of that. I do like your magazine and I learn a little more about my Vic with each issue. Keep it up.

F.W. Hadlehurst, Hillside Cottage, Alford Road, Alford, Lincolnshire, LN13 0JW.

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